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A FACTORED MEASURE OF ELLIS' IRRATIONAL BELIEF SYSTEM,  
WITH PERSONALITY AND MALADJUSTMENT CORRELATES

by

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## CHAPTER I

### INTRODUCTION

Within the last ten years there has been increasing interest in the techniques of rational-emotive therapy as originally developed by Albert Ellis (1955, 1956, 1957a) and subsequently supported by an increasing number of other psychotherapists. Although Ellis' position developed rather pragmatically, growing out of trial and error modifications of therapeutic approaches, there was also a simultaneous development of an explanatory theoretical system regarding the origins of emotional disturbance and maladjustive behavior. Despite acceptance and clinical confirmation of the principles upon which rational-emotive therapy is based by a number of authors, there has been surprisingly little published research of any sort in support of the position outside the therapeutic relationship.

A prominent aspect of Ellis' approach to therapy is the hypothesis that human emotional disorders and maladjustments are a function of the extent to which individuals accept and act upon assumptions, premises, and ideas that are essentially irrational in content. He has extracted and extensively discussed (1962) at least ten of these beliefs which he finds to be common in our culture and highly prevalent among neurotics and other disturbed persons.

One of the basic difficulties and limitations affecting any research efforts concerning this hypothesis is the present lack of objective methods to quantify the relative presence or absence of these beliefs in individuals. If efficient and convenient means for measurement were available, a number of fruitful avenues for research into this hypothesis and possible objective confirmation of it would be opened.

## Purposes of the Research

The primary purpose of this research was to validate as measurable constructs the ideas Ellis has proposed as irrational beliefs and to develop a written instrument sufficiently reliable and valid for research purposes to measure the extent to which persons hold these irrational beliefs.

A secondary purpose of this research, in the event the primary goal was attained, was to determine the relationship of these irrational beliefs to various indices of emotional disturbance and maladjustment both as concurrent validation of the instrument and as a preliminary investigation of Ellis' position.

## Rationale and Theory of Rational-Emotive Therapy

Although a number of books and articles have appeared which present various facets of the rational-emotive approach (Ellis, 1955a, 1955b, 1956a, 1956b, 1956c, 1957a, 1957b, 1958a, 1958b, 1959, 1963a, 1963b, 1963c, 1964, 1965, 1966, 1967; Ellis & Harper, 1961a, 1961b; Ellis, Wolfe & Moseley, 1966; Ellis & Blum, 1967; Hauck, 1967; Grossack, 1967), Ellis has published one book (1962) specifically devoted to a full exposition and defense of rational-emotive therapy and its underlying theoretical basis. An adequate and thorough understanding of this position would require reference to these sources. However, the essence of rational-emotive therapy and theory can be stated fairly succinctly.

Many of the principles of rational-emotive therapy are by no means new, as Ellis has been quick to point out. In fact, some of them were originally stated by ancient Taoist and Buddhist thinkers and by early Greek and Roman philosophers. The statements of Epicetus (1899) in the first century A.D. that "men are disturbed not by things, but by the views which they take of them" and of Marcus Aurelius (1890) in the same period that "if you are pained by any external thing, it is not this thing that disturbs you but your own judgment about it" aptly express one of the core concepts of rational-emotive theory.

Ellis contends that the concept of thought and emotion as two separate and even disparate processes is inaccurate and artificial.

In agreement with a number of other recent authors (McGill, 1954; Bousfield & Orbison, 1952; Arnheim, 1958; Rokeach, 1960; Arnold, 1960) he argues that the greatest part of what is normally called emotion is nothing more than strongly biased, prejudiced, evaluative, or nonrational thought with natural physiological concomitants. Immediate and unreflective emotion, whether positive or negative, is primarily a function of instinctive tendencies highly controlled or modified by one's world view and experiential history. But sustained or reflective emotion is primarily dependent on one's philosophic attitudes and thought processes. As Branden (1962) points out, "Man's value judgments are not innate. Having no innate knowledge of what is true or false, man can have no innate knowledge of what is good or evil. His values, and his emotions, are the product of the conclusions he has drawn or accepted, that is: of his basic premises." Ellis argues that sustained, reflective negative emotions are the essence of what is normally called "emotional disturbance" and that they are not only originated but sustained by personal philosophies and beliefs which are assumed to be true but are in fact irrational and incompatible with adjustive behavior. Inaccurate perceptions and inappropriate behavior result from reliance on the beliefs, and the thought patterns and self-verbalizations built on them augment and nourish unpleasant emotions.

The unique human attribute of language and the symbol producing facility underlying it allow man to be highly rational; to integrate experience and anticipate future events in a logical manner (Kelly, 1955); to perceive relationships and to form abstract concepts having the quality of reality; and to determine to a large extent his perceptions and behavior on the basis of highly personalized and unique constructs and thought processes. But this ability is a two edged sword that also allows man to define external stimuli as good or bad rather independently of the sensate processes; to build construct systems, beliefs, and philosophies that are inconsistent with either reality or each other; to protect these internal systems with perceptive processes; and to have his perceptions and overt behavior reinforced by all kinds of symbolic, nonsensate processes which may have no relationship to his sensory contact with the external world.

Ellis therefore states (1962) the central theme of rational



emotive therapy as follows:

...That man is a uniquely rational, as well as a uniquely irrational, animal; that his emotional or psychological disturbances are largely a result of his thinking illogically or irrationally; and that he can rid himself of most of his emotional or mental unhappiness, ineffectuality, and disturbance if he learns to maximize his rational and minimize his irrational thinking. It is the task of the psychotherapist to work with individuals who are needlessly unhappy and troubled, or who are weighted down with intense anxiety or hostility, and to show them (a) that their difficulties largely result from distorted perception and illogical thinking, and (b) that there is a relatively simple, though work-requiring, method of reordering their perceptions and reorganizing their thinking so as to remove the basic cause of their difficulties.

It is my contention, in other words, that all effective psychotherapists, whether or not they realize what they are doing, teach or induce their patients to re-perceive or rethink their life events and philosophies and thereby to change their unrealistic and illogical thought, emotion, and behavior (Ellis, 1959; Stark, 1961).

#### Ellis' Irrational Belief System

As Ellis has repeatedly pointed out, the fact that the family and other institutions of a culture directly and indirectly indoctrinate individuals with values and beliefs which may be neither consistent nor sensible has been widely recognized for some time. Many sociologists and anthropologists have documented this introjection of cultural values (Frazer, 1959; Hoffer, 1951, 1955; Rokeach, 1960; Rosenfeld, 1962; Tabori, 1959, 1961), and this source of individual values and beliefs is now widely recognized. For example, Cuber, Harper, and Kenkel (1956) discuss "the older nonrational acceptance of value positions" in American society and point out that many of our most cherished and dogmatically upheld values are only assumed to be "good" values and are rarely reviewed or questioned. La Barre (1955) indicates that in our society "a child perforce becomes a Right Thinker before he learns to think at all."

Neo-Freudian psychoanalytic authorities have been distinguished by their increasing emphasis on culturally induced beliefs and values as a source of human disturbance. Horney (1939), Fromm (1941, 1947, 1955), Reich (1949), and a number of others have been concerned with illogical social teachings as a primary source of neurosis.

Through his therapeutic relationships and in the course of the development of rational-emotive theory, Ellis has noted and abstracted a number of beliefs or philosophies which he finds to be highly prominent in the thought processes of emotionally disturbed and maladjusted people. He considers these beliefs to be basically irrational in nature and content and to be supportive of neurosis and disturbance. In his text on rational-emotive therapy, Ellis (1962) discusses fully both the irrational elements in these ideas and the alternatives to these philosophies which would be conducive to mental health. The following listing provides the beliefs as set forth by Ellis with a brief summary of only the major elements of irrationality involved.

#### Irrational Belief 1

The idea that it is a dire necessity for an adult human being to be loved and approved by virtually every significant other person in his community.

The essence of this belief is that love and approval are needs or necessities rather than desirable conditions. A demand that one must be approved by others sets a perfectionistic, unobtainable goal. Even if one could win approval from all important others, he would still tend to worry about the degree of approval or the maintenance of it. As Loevenger (1962) and Stewart (1962) have observed, a dire need to be loved is nearly always accompanied by high anxiety.

If one is always to be loved, one always has to be lovable, and this sets up an impossible goal for oneself. Inordinate regard for the approval of others requires giving up one's own wants and preferences and therefore negates self-directing behavior. Overconcern with being loved inhibits and almost bars the creative, self-actualizing involvement in loving others.

#### Irrational Belief 2

The idea that one should be thoroughly competent, adequate, and achieving in all possible respects if one is to consider oneself worthwhile.

Again this belief involves the substitution of a demand for a more rational desire. Linkage of one's self-worth to overly high expectations for oneself leaves the way open for anxiety and feelings of

personal worthlessness. A person who feels he must achieve invariably compares himself to others and becomes other-directed rather than self-directed. Placing great emphasis on achievement confuses one's extrinsic value (the value that other people place on one's performance or characteristics) with one's intrinsic value (one's aliveness or one's value to oneself) (Hartman, 1959). Overconcern with achievement usually results in increased fear of taking chances, making mistakes, and of failing at certain tasks; this in turn tends to sabotage the very achievement for which one is striving.

### Irrational Belief 3

The idea that certain people are bad, wicked, or villainous and that they should be severely blamed and punished for their villainy.

This belief implies absolute standards of truth or goodness which are in fact purely definitional and without scientific foundation. Also implied is a degree of free will and choice of conduct which is inconsistent with present knowledge of the various determinants of behavior. Although people should of course accept responsibility for what may generally be considered "wrong" or "immoral" behavior, this does not mean they should be blamed or condemned by either themselves or others for their ignorance, stupidity, or disturbance. Blame tears down human worth and is functionally inoperative because it does nothing to help the person improve. Blaming results in hostility and anger which are basic causes of much human disturbance (Chambers & Lieberman, 1962). Invariably one who blames others will also blame himself, and hostility and anger toward oneself greatly inhibit the rational goals of acceptance of one's fallibility together with the determination of ways to improve one's behavior.

### Irrational Belief 4

The idea that it is awful and catastrophic when things are not the way one would very much like them to be.

This belief allows people to utilize frustrating circumstances to maintain emotional disturbance. It is perfectly reasonable to dislike undesirable situations; but the belief that things should be

different because one desires them that way is highly irrational. The rational approach to frustration is to try to change unpleasant circumstances if possible but then accept them philosophically if they cannot be changed. Any sustained negative emotion over such circumstances helps attain neither goal.

Although there is much evidence supporting the hypothesis that frustration leads to aggression (Dollard, Doob, Miller, Mowrer, & Sears, 1939; Dollard & Miller, 1950), it is probable that in humans it is not really the frustration itself, but the subjective attitude toward and perception of the frustration that really causes hostility and aggression, as indicated by Pastore (1950, 1952) and Arnold (1960). Melzack (1961) and others have similarly shown that even physical pain is experienced and reacted to primarily as a function of the subjective, attitudinal set of the individual rather than the intensity of the painful stimulus. Therefore rationally no amount of frustration or deprivation need make a person unhappy if he does not define his preferences as a dire necessity.

#### Irrational Belief 5

The idea that human unhappiness is externally caused and that people have little or no ability to control their sorrows and disturbances.

As previously pointed out, people are disturbed not by external events but by their interpretation of those events. This belief makes it possible for one to abdicate responsibility for one's emotions and to project that responsibility to other people or to the environment. Although it may be difficult for people to control depression, unhappiness, and other negative emotional states, particularly if they have had little practice at doing this, it is certainly not impossible. If instead of saying, "this situation makes me unhappy," a person could more rationally say, "I am making myself unhappy by what I am telling myself about this situation," then this irrational belief could not be maintained.

#### Irrational Belief 6

The idea that if something is or may be dangerous or fearsome

one should be terribly concerned about it and should keep dwelling on the possibility of its occurring.

Although it is wise to consider dangerous possibilities and to plan to avert them or minimize their consequences should they occur, this is the type of objective, rational thought which has nothing in common with anxiety, worry, and unrealistic fear, all of which are basically irrational and maladaptive. Overconcern about possible future events usually is self-intensifying since it leads to exaggeration of the chances for occurrence of the dreaded event. It sufficiently inhibits calm rational thought to the extent that one is less able to meet dangers effectively when they do occur and one finds it difficult to properly evaluate dangers. Many of the dreaded events which people worry about are inevitable or entirely out of the control of the person involved, so that worry has only the negative results of making life less enjoyable until or if the events do occur.

#### Irrational Belief 7

The idea that it is easier to avoid than to face certain life difficulties and self-responsibilities.

This idea considers the ease of avoidance at the time of decision but ignores the many problems and annoyances caused by avoidance. In essence this irrational belief emphasizes the immature approach to problems, placing greater emphasis on the pleasure or the pain of the moment without regard to the long term benefits to be obtained from meeting the challenges of life in a commitment to long term goals.

#### Irrational Belief 8

The idea that one should be dependent on others and needs someone stronger than oneself on whom to rely.

Although in our society there is a necessary amount of dependence and cooperation with others, there are a number of reasons not to overemphasize dependence. The more one relies on others, the more he finds it necessary to give up his own goals and desires in life. The more one relies on others for guidance and assistance, the less he tends to do for himself and the more he tends to lack basic self-confidence and security. By depending on others one puts himself

needlessly at the mercy of outside forces which he cannot possibly control; and if the sources of security that he creates are eliminated for any reason, he is subject to severe problems through his being unprepared and unable to handle his own life.

#### Irrational Belief 9

The idea that one's past history is an all important determiner of one's present behavior and that because something once strongly affected one's life, it should indefinitely have similar effect.

This irrational belief also involves denial of responsibility for one's behavior. Although it is very true that as a result of the past one may find it very difficult to change in some ways, it is highly irrational to believe that it is impossible for change to occur. Reliance on this philosophy makes it much more difficult to meet problems efficiently as they arise. It provides a powerful excuse to avoid self-improvement and to drift along in a self-indulgent, problem-avoidant way of life which often leads to emotional disturbance and maladjustment.

#### Irrational Belief 10

The idea that there is invariably a right, precise, and perfect solution to human problems and that it is catastrophic if this perfect solution is not found.

Although it is sensible and wise to want to achieve the most practical and feasible solution to one's problems, it is highly unrealistic and irrational to expect there will always be a perfect solution available. This belief involves a desire for certainty in everything, and as Reichenbach (1953) and others have shown, we live in a world of probability and chance with nothing certain. Perfectionism is not only irrational, it is also impractical in that it normally limits possible solutions to problems. Not only are satisfactory solutions harder to obtain, it is much more difficult for the perfectionistic person to reach any solution since he normally feels he must consider every possible side of every possible alternative.

### Other Measurement Efforts Reported

At the time this research was initiated, there was no report in the literature of other efforts to measure the system of irrational beliefs which is the subject of this study. However, two pertinent articles have appeared since that time.

Hartman (1968) has reported on the construction of a self-administering, objectively scored, diagnostic instrument for use in assessing specific levels of irrational thinking. He assembled an original pool of 135 items related to prevalent irrational ideas. On the basis of item-total correlations in an administration to more than 500 college students, 60 items were retained to comprise his Personal Beliefs Inventory. Scoring for each item is on a six point disagree-agree scale. No subscores are calculated for specific beliefs; the test yields only a total score ranging from 0 to 300. Reliability coefficients were obtained from a sample of 30 college students and another sample of 85 college students. Respectively, test-retest stability coefficients were .89 and .91 while split-half reliability using the Spearman-Brown formula were .95 and .90. No formal validation studies were reported, although two studies are cited which would strongly imply that formal validation procedures would be successful. In one case 8 individuals undergoing individual rational-emotive psychotherapy showed a drop in mean scores from 236 to 121 after ten sessions. In the other example 23 students in a psychopathology class had a change in mean scores from 163 to 91 between pretest and post-test.

Argabrite and Nidorf (1968) have reported a measure largely utilizing the irrational ideas described by Ellis. In format this test consists of 15 five point scales anchored at one end with a self-report description of an irrational belief and anchored at the other end with a description of the antithetical rational idea. For the most part the measure retains the exact language of Ellis as well as the paraphrasings of Lynn (1966) and Gullo (1966), who restated some of Ellis' descriptions. Two items were added to cover additional irrational beliefs contributed by the authors. Subjects were asked to select the scale position most representative of them in their personal beliefs. This measure was administered to 204 students in an

introductory psychology class. The only test statistics reported are a standard dispersion for total score and class means for both total score and individual items. Although a qualitative report was given that the test tends to correlate positively with other, more traditional tests of psychopathology without the correlations being particularly high, no data is presented supporting this statement.

### Personality Factors as Indices of Psychopathology

Perhaps the best known empirical system of personality study and description at the present time is that based primarily on the work of Raymond B. Cattell, Ph.D., D.Sc., Research Professor of Psychology at the University of Illinois. Cattell's reputation in the areas of psychometrics and factor analytic investigation of personality and motivation has become well established over 35 active research years. He has published some 20 books in the field of psychology, well over 200 professional articles, and some 25 psychological tests.

Cattell has described the procedures and results of his research into the structure of personality in both detailed (1946, 1957) and simplified (1965) books and any number of articles. In brief, it may be said that through repeated factor analytic studies of the results of innumerable behavioral ratings and observations, objective testing of many types including cognitive and physiological tasks, and self-report questionnaire items, a number of consistent, distinct, measurable personality source traits have been identified. A number of instruments have been constructed to measure these specific factors in personality, but by far the most widely known and used in both research and applied settings have been those of the questionnaire type. Among these are the 16PF (Cattell & Eber, 1961), the HSPQ (Cattell & Beloff, 1963), the NSQ (Scheier & Cattell, 1961) and the IPAT Anxiety Scale (Cattell & Scheier, 1963), offering measures of from five to sixteen primary factors.

Since these source traits are based on oblique factors and are intercorrelated to some extent, although not highly so, it is possible to factor analyze scores on all sixteen of them and secure second-order factors more descriptive of broad spectrums of behavior. Of the four prominent second-order factors appearing, the one which has no



doubt received most attention in both research and clinical use is that of anxiety, which is loaded by factors C-, H-, L+, O+, Q3-, and Q4+. The anxiety factor resulting from these primary factors has now been solidly confirmed as to structure in some 20 separate studies, the most recent of note being by Cattell (1965b), Karson (1961), Horn (1963), and Mitchell (1963). It can be computed by specification equation directly from the scores on its components; or the IPAT Anxiety Scale, which measures only these traits in a weighted manner, can be used to provide a direct score.

Kear-Colwell's (1965) study showed a correlation of  $+0.76$  for the anxiety factor and neuroticism as defined by Eysenck (1953) and measured by the Maudsley Personality Inventory. Karson (1958) reaches the conclusion ". . . that the K, F, and L scales of the MMPI all appear to be measuring the second-order questionnaire factor of anxiety." Kahn et al. (1964) factor analyzed items from the MMPI, CPI, Cornell Medical Index, and Bernreuter Personality Inventory, along with the IPAT Anxiety Scale and the 16PF. The top loading on the simple structure factor identified as anxiety was  $+0.90$ , achieved by the IPAT Anxiety Scale total score. Loadings from other scales varied from  $+0.43$  to  $+0.73$ .

A number of studies have shown a high relationship between scores on the anxiety factor and various psychiatric symptoms, following the lead of Scheier et al. (1961, 1962). For example, Cattell and Rickels (1964) studied clinical symptoms in relation to the anxiety factor. They found that psychiatric evaluations of irritability, anxiety, depression, and phobic behavior loaded  $+0.42$ ,  $+0.33$ ,  $+0.32$ , and  $+0.22$  respectively on the anxiety factor despite well known limitations in validity and inter-rater reliability in clinical judgments. These same studies, however, showed that somatization and hypochondria did not load on the anxiety factor, illustrating that even though anxiety as defined by the factor may predict much of neurotic or disturbed behavior, it is not the only element doing so.

The increasing number of studies relating the anxiety factor defined by the six primary traits or factors to various indices of maladjustment and emotional disturbance are well cited in Cattell and Scheier (1961, 1963) and more recently by the continuing IPAT Information Bulletin Series. In general the studies confirm the basic

position of anxiety as an inverse function of mental health and adjustment. It seems to be a common element in otherwise different personalities which is characteristic of a wide variety of clinical groups. Not only are nearly all nonpsychotic clinical groups highly discriminated from normals by the primary factors contributing to anxiety, but Court (1965) has even found acute schizophrenics to suffer from a very high anxiety level.

The literature therefore supports the use of anxiety and the primary personality factors comprising it as adequate and valid indices of general maladjustment and emotional disorder, with the added advantages of the indices being obtainable in a single administration with one instrument.

#### Admitted Symptomology as Indices of Psychopathology

The quickest and most common clinical method of determining the extent of maladjustment and emotional disturbance is to inquire into a number of complaint areas common to those who are having problems. If the person answers truthfully, this procedure provides the most direct measure of the subjective experience of negative emotion and the overall difficulty the person is having in coping with life's problems. An important question, however, is whether or not the person who has problems will answer truthfully and admit them instead of following social desirability bias (Edwards, 1953, 1957). Of course, some persons will not, but in general as Peterson (1965) has shown, social desirability bias is a function of perceived adjustment. As has been illustrated in a number of studies (Bendig, 1959; Cattell & Scheier, 1958, 1961; Couch & Kenniston, 1960), the willingness to admit defects in oneself tends to be an intrinsic part of the anxiety-maladjustment syndrome. Even though Sweney and Rich (1968a, 1968b) found that response bias extremely affected MMPI scores as well as 16PF scores to a lesser extent, the response style was determined to be a measure of anxiety; and the same phenomenon is probably operant in direct questions concerning symptoms. Therefore the admission of psychiatric symptomology should be an excellent index for actual psychopathology.

Common Demographic Variables and Psychopathology

It is generally considered that the more common types of emotional disorder and maladjustment are most severe at early ages, tending to decrease somewhat with increased maturity and experience in life (Coleman, 1964). Bahn et al. (1961) found psychoneurotic disorders to be more common in early adulthood than during any other life period. Cattell (1965a) states that anxiety is found to be high in adolescence, gradually declining as the individual settles his problems of occupational adjustment, marriage, and social setting.

Bahn et al. (1961) also found psychoneurotic disorders to be more frequent among females than among males. Results from many sources confirm that females have a significantly higher level of anxiety than males (Bendig, 1960; Burnett & Thompson, 1963; Taylor, 1966; Wheeler, 1965). These findings substantiate typical clinical experience where substantially more females than males appear at outpatient facilities for treatment.

Hardt and Feinhandler (1961) and Jaco (1960) state that in general the range of educational background is the same for psychotic patients as for the general population. Coleman (1964) remarks that psychoneurotic disorders are common in all educational and socio-economic backgrounds as well as all educational levels. However, he does not substantiate this opinion, and there is strong reason to believe from a logical viewpoint that the incidence of at least nonpsychotic disturbance would have some inverse relationship to education. The general positive relationship between intelligence and education attained is intensified by the fact that most common measures of the former incorporate knowledge and achievement tests, particularly when the measure is written, as Cattell has pointed out (1965a). Despite Coleman's statement above, the studies of Terman (1940), Juda (1949), Terman and Oden (1959) and MacKinnon (1962) all emphasize a negative relationship between mental disturbance or irrationality and intellectual capacity. Wechsler's (1958) operational definition of intelligence as "the aggregate or global capacity of an individual to act purposefully, to think rationally, and to deal effectively with his environment" incorporates a defined inverse relationship with maladjustment which should hold for education also.

## CHAPTER II

### METHODS AND PROCEDURES

#### Plan of the Research

The plan of the research involved the following steps or phases:

##### Basic Decisions

Decisions were made involving test design and format, procedures, selection of criterion instruments, statistical methods to be employed, sample characteristics, research hypotheses, etc. in consideration of the research goals. The results of these decisions are incorporated into the discussions which follow.

##### Test Construction

Involved in this phase were item writing, item selection, and initial construct validation.

##### Test Investigation

This phase involved investigation of the various descriptive test statistics, cross validation of the test as a measure of the constructs involved, concurrent validation of the test in terms of its relationship to various criteria, and determination of the relationship between test scores and common demographic variables.

#### Research Hypotheses

As a means of structuring both the accumulation of data and its statistical analysis and to provide an a priori basis for decisions regarding significance of results, the following research hypotheses were formulated:

### Research Hypothesis 1

As determined by factor analysis, the irrational beliefs enunciated by Ellis are sufficiently distinct in content and stable in structure to be measurable as separate constructs defined by factors which can be replicated in a separate nonhomogenous population.

### Research Hypothesis 2

As determined by loadings of scale items on factors defining the scales, construct validity of Irrational Belief Test (IBT) scales will exceed a minimum acceptable value of .40.

### Research Hypothesis 3

The IBT will have sufficient homogeneity within scales to provide a minimum acceptable internal consistency reliability of .50 in any scale and a mean reliability of .60 for all scales.

### Research Hypothesis 4

The reliability of measurement in the IBT and the stability of the domain will be sufficient to provide a test-retest correlation between scores over a 24 hour period of not less than .60 for any scale and not less than a mean of .75 for all scales.

### Research Hypothesis 5

There will be a significant positive functional relationship between irrational beliefs as measured by the IBT and self-report of maladjustment symptoms.

### Research Hypothesis 6

There will be a significant positive functional relationship between irrational beliefs as measured by the IBT and scales C-, H-, L+, O+, Q3-, and Q4+ of the 16PF.

### Research Hypothesis 7

There will be no significant functional relationship between

irrational beliefs as measured by the IBT and scales A, E, F, G, I, M, N, Q1, and Q2 of the 16PF.

#### Research Hypothesis 8

There will be a significant negative functional relationship between irrational beliefs as measured by the IBT and intelligence as measured by scale B of the 16PF.

#### Research Hypothesis 9

The IBT will be a sufficient discriminator of mental disturbance that patients in a mental hospital will attain significantly higher scores than will subjects from a general adult population.

#### Research Hypothesis 10

There will be a significant negative functional relationship between irrational beliefs as measured by the IBT and age of the subjects.

#### Research Hypothesis 11

Females will score significantly higher in irrational beliefs as measured by the IBT than will males.

#### Research Hypothesis 12

There will be a significant negative functional relationship between irrational beliefs as measured by the IBT and education level of the subjects.

#### Subjects

Group A was the sample used in initial item selection and construct validation of the instrument. It consisted of 131 junior and senior students in advanced undergraduate courses in psychology at the Texas Technological College, Lubbock, Texas. Despite the implications of the name, this is a multiple school major university with over 19,000 students. The students were therefore representative of

the diversified backgrounds and interests found in such an academic climate. The sample was approximately 60% female. Most ages were in the early twenties.

Group B was the larger heterogeneous sample used for cross validating factor structure, in determining descriptive statistics on the instrument, in establishing concurrent validity against external criteria, and in analyzing the effect of concomitant variables. Total sample size was 427 subjects. The sources and selection of subjects was multiply determined by the need for a sufficiently large sample, heterogeneity with respect to major demographic variables; and maximum variance with respect to emotional disorder and maladjustment. In the sample were 105 junior college students; 73 senior students at the Texas Technological College (none from group A); 72 patients at a mental hospital; and 177 volunteers from a general adult population.

The 105 junior college subjects were students at South Plains College, Levelland, Texas. This is a relatively smaller school in a smaller city as compared to Texas Technological College, and it was felt that dividing the student portion of the total sample between the two schools would tend to insure more heterogeneity in a number of respects.

The hospital sample was secured at Big Spring State Hospital, Big Spring, Texas. Included in the sample were 24 alcoholics, 13 chronic schizophrenics in an intensive rehabilitation program, 15 mixed diagnoses involving chronicity, and 20 mixed new admissions with acute symptomology. Except for the alcoholics, all were receiving medication for symptom control. All age groups were represented in the sample, but there was some probable bias toward lower educational and socio-economic levels.

The volunteers in the general adult sample were solicited and secured from a variety of sources. Occupations represented included school teachers, route salesmen, nurses, secretaries, business executives, USAF personnel, outside salesmen, and housewives. Ages ranged from 18 to 60, with the majority of subjects being in the 25 to 40 year age range.

## Variables

### The Research Instrument

The instrument constructed and investigated in this study was called the Irrational Beliefs Test or, for brevity, the IBT. The test format used was that of the typical self-report attitude or value scale. The entire instrument was a combination of ten separate scales, each measuring a specific irrational belief as discussed by Ellis. Each item presented a statement with which subjects were asked to disagree or agree. Scaling was on the Likert (1932) model with summative scoring over a five position response scale for each item. The IBT thus provided both individual scale scores and a total score summing all scales.

For utility in administration, scoring, and processing of data, the instrument was presented to subjects in the form of a reusable test folder with a separate answer sheet. A reproduction of the test may be seen in the Appendix. Answer sheets were standard forms used for IBM Optical Scanner machine scoring.

Factor analysis was one of the methods used for test validation, including as variables not only the test items but criterion variables as well. In view of the 135 maximum variable limitation in the factor analysis programs available at the computer center used in the study, it was decided to limit item count for the IBT to 100 providing sufficient reliability could be obtained. In addition, it was felt that a 100 item test answered on a 5 position scale would involve a testing time of approximately twenty minutes, fitting well the criterion of utility.

For ease in both hand and computer scoring, items were arranged in rotating order by scales so that the last digit of each item number would correspond to the scale and irrational belief involved. Despite this identification of scale by item number, a key is necessary for scoring since both direct and reverse scored items were used and randomly arranged.

This instrument furnished a total of 111 variables used in the research. Included were 10 item scores for each scale, a summated score for each scale, and a total score summing all item scores.



## The Sixteen Personality Factor Questionnaire

The established psychological instrument chosen to furnish criterion variables for this study was the Sixteen Personality Factor Questionnaire by Cattell and Eber (1961), more often called the 16PF. This test furnishes scores on each of sixteen separate personality factors and is the leading instrument produced by the research efforts of Cattell and others in the investigation of personality through factor analysis, as previously discussed. The personality dimensions measured by the test are bipolar source traits that have been described both by technical titles and by lists of adjectives which correlate highly with the trait factors. Full discussions of the nature of these traits and their origins are found in a number of texts (Cattell, 1946, 1950, 1957; Hall & Lindzey, 1957; McClelland, 1951). Adjectival descriptions of the primary factors measured by the 16PF are shown in Table 1 on the next page.

The full background of the 16PF is documented in four books and over 100 journal articles as referenced in the Handbook (Cattell & Eber, 1962). In the oldest and most popular forms (A & B), split-half reliabilities for each of the scales range from .71 to .93, averaging about .83 or .84. Internal construct validities have been estimated for each of the scales from known factor loadings of test items on the factors and also separately from the correlation of two factor halves (A and B forms together). The resulting estimates range from .73 to .96, averaging approximately .88. Coefficients for each form separately are lower in accordance with the standard formulas involving test length.

All forms of the 16PF are presented in test booklets which may be used with separate answer sheets and administered either to groups or individuals. Form A, which was used in this study, consists of 187 items which are intelligible to a wide range of educational levels and suitable for all adult ages. Minimum limits are usually considered to be a sixth grade reading level and ages 15 to 16.

Since in the study it was desired to investigate the research instrument with respect to both personality and maladjustment variables, use of the 16PF as a criterion instrument offered a number of advantages. With any instrument measuring specific factors in behavior,

TABLE 1

## ADJECTIVAL DESCRIPTION OF 16PF SOURCE TRAITS

Factor	Low (-) score descriptions	High (+) score descriptions
A	Reserved, detached, critical, cool	Outgoing, warmhearted, easy-going, participating
B	Less intelligent, concrete-thinking	More intelligent, bright, abstract-thinking
C	Affected by feelings, easily upset, emotionally labile	Emotionally stable, reality facing, maturely calm
E	Humble, mild, obedient, conforming	Assertive, aggressive, independent, stubborn
F	(Sober, prudent, serious, taciturn	Happy-go-lucky, heedless, gay, enthusiastic
G	Expedient, makes own rules, by-passes obligations	Conscientious, persevering, staid, rule-bound
H	Shy, restrained, diffident, timid	Venturesome, socially bold, uninhibited, spontaneous
I	Tough-minded, realistic, self-reliant, no-nonsense	Tender-minded, dependent, over-protected, sensitive
L	Trusting, adaptable, free of jealousy,	Suspicious, self-opinionated, hard to fool
M	Practical, externally oriented, careful, conventional	Imaginative, internally oriented, impractical
N	Forthright, natural, artless, sentimental	Shrewd, calculating, penetrating, worldly
O	Placid, self-assured, serene, confident	Apprehensive, depressive, worrying, troubled
Q1	Conservative, respecting established ideas, tolerant	Experimenting, liberal, critical, free-thinking
Q2	Group dependent, a "joiner" and good follower	Self-sufficient, prefers own decisions
Q3	Casual, impulsive, careless of protocol, untidy	Controlled, compulsive, self-disciplined
Q4	Relaxed, tranquil, torpid, unfrustrated	Tense, driven, overwrought, fretful

it is difficult to adequately explain or predict on the basis of any one factor. With the 16PF a number of traits contributing to variance in personality can be assessed at the same time, with the interrelationships between them and the multiple determinants of behavior being more adequately taken into account in any explanatory or predictive endeavor. The efficacy of this approach is seen in the increasing number of studies appearing in the IPAT Bulletins distributed by the 16PF publisher and elsewhere showing multiple correlations of 16PF factors with specific life criteria ranging from .50 to as high as .88. These criteria cover such diverse areas as school achievement, response to therapy, and earnings in salesmanship. The use of this instrument as a criterion measure in the present study therefore enhanced the possibility of useful, explanatory data being obtained.

Another advantage of the 16PF as a criterion instrument concerned the use of specific scores as indices of emotional disorder or maladjustment. As previously discussed, six of the primary factors and the second-order factor they contribute to have been shown to be excellent indices in this clinical area. Although the IPAT Anxiety Scale would have involved less testing time and could have furnished a direct measure of the second-order factor, the full 16PF was used for the following reasons: (1) The Anxiety Scale would not have provided measures of the other personality traits desired as criteria. (2) Its primary factor scales vary in length to provide weighted summated scoring for the anxiety factor, and as a result some of them are less reliable than 16PF scales on the same traits. (3) It was desirable to use the component primary traits as criteria rather than the more global measure since it was possible that irrational beliefs would be a function of some of them but not all, and comparative relationships were of interest.

#### Self-Report of Maladjustment Symptoms

In addition to 16PF factors, it was decided to include as criteria the degree of maladjustment perceived in themselves by the subjects of the study. A brief 25 item instrument was devised to measure the relative presence or absence of common and ordinary psychiatric complaints. This instrument as administered is shown in the

Appendix. The items are simple statements such as "I worry". The subjects responded on a five point scale ranging from "almost never" to "most of the time." Twenty-five additional criteria of symptomology were therefore provided, in addition to a total score incorporating variance on all the symptoms.

The use of such an instrument as a criterion measure in the research was justified on several counts. The items offer a direct and rather parallel measure of the same types of complaints offered by those who come into a clinical situation for counseling or therapy. The scale was not a psychological test in the usual sense but rather a direct questioning device with a response format allowing objective scoring.

In addition it was felt that any distortion in responses would intensify desired information instead of minimizing it. As previously discussed, perceived maladjustment and anxiety are a direct function of the willingness to admit weaknesses and problems. Therefore the use of scores on this instrument as criteria for emotional distress would not be hampered to any great extent by the normal problems of response bias.

#### Demographic Variables

Since it was desired to consider the relationship of basic demographic variables to the incidence of irrational beliefs as measured by the IBT and since information as to age, sex, and education level was readily available from the subjects, these variables were included in the study.

Due to the necessity of handling data input for the study with an IBM Optical Scanner with five position scales, it was necessary to break age and educational level data arbitrarily into classificatory data. Since sex exists as a dichotomous variable, the recording of this information on the answer sheets was no problem. For education level, the five classifications used were as follows: (1) did not complete ninth grade; (2) did not complete high school; (3) did not finish two years of college; (4) did not complete college; (5) college graduate or above. Subjects were assigned to the highest level possible. For age, the following classifications were used: (1) ages 21 and below;

(2) ages 22 to 30; (3) ages 30 to 40; (4) ages 40 to 50; (5) ages 50 and over.

## Procedures

### Administration of Instruments

Except for the general adult volunteers in Group B, all testing was by group administration with supervision. Group A accomplished the preliminary 200 item IBT only. All subjects in Group B were administered the final 100 item IBT, the Form A 16PF, and the Symptom Measure. Adult volunteer subjects were given individual packets containing the three test instruments, the answer sheets, and standard instructions. Test packets were usually returned with two or three days, and in the majority of cases it is probable that very little time lapsed between accomplishment of the several tests. All subjects were given or instructed to take the Symptom Measure as the final instrument so that its more obvious clinical nature would not bias IBT and 16PF responses .

### Processing of Data

All data processing and statistical analyses were done using the facilities of the Computer Center at the Texas Technological College. At the time of the study the equipment available included an IBM 1401 Computer with an Optical Scanner as one accessory and an IBM 7040 Computer on which all statistical work was done.

Answer sheets for all groups were processed through the Optical Scanner with direct card output. Cards were sequence punched to allow ready identification and prevent possible mishandling errors. All data was then read onto tape for storage and processing through the reversal and scoring programs. Both the answer sheets and the original card decks were retained and stored for future reference if necessary.

A special computer program was written to reverse IBT scores of both groups so that signs in statistical results such as correlation matrices would be consistent and meaningful without reference back to item content. Special programs were then written and used to

secure both scale scores and total score for the IBT, scale scores for the 16PF, and total score for the Symptom Measure. Tape output from the scoring program for Group A provided 200 item scores, 10 scale scores, and a total score for the preliminary IBT. Tape output from the scoring program for Group B provided 100 IBT item scores, 10 IBT scale scores, an IBT total score, 25 symptom item scores, a total symptom score, 16 scale scores from the 16PF, and values representing age, sex, and education level. This data was then transferred to punched cards for the routine statistical processing, and the tapes were retained for reference in case of damage to the card decks.

The statistical analysis of the data was done using standard programs which were a part of the Computer Center Statistical Library. Product-moment correlations and descriptive statistics were secured both by direct program and as part of the output from other programs such as that for factor analysis. All factor analysis was done with the Burdsal Factor Analysis Program TTS001, which extracts factors according to a number of criteria by the principal axes method and provides both orthogonal and oblique rotation by the varimax and promax methods respectively. Stepwise regressions and t-tests for differences between groups were done with standard programs of the Biomed group originally secured from the Health Sciences Computing Facility of the School of Medicine, University of California, Los Angeles.

### Test Construction

All initial items were written by the author with the goal that they should reflect relative presence or absence of the appropriate irrational belief in Ellis' system. Forty items were written for each belief, twenty of them as direct measures and twenty as inverse measures.

In line with the suggestions of Guilford (1954), it was decided to select 200 items for initial administration in order to utilize the statistical relationships for final selection to 100 items. It was necessary therefore to discard one half the written items, retaining the twenty best items on each scale for initial administration. The method chosen for this stage of item selection was that of consensual validation based on content through the use of judges. The author

acted as one of the judges, with another being a college graduate naive in psychometrics and psychology in general and the third being a Ph.D. psychologist with major interests in psychometrics and considerable test writing experience. Each judge was required to read Ellis' (1962) discussion of each irrational idea immediately prior to selection of items for each scale. Each judge selected the twenty items for each scale that he felt would most accurately describe and measure attitudes inherent in the espousal of the irrational belief. On most scales 10 to 15 of the items were selected by all three judges, and these items were all included in the final selection. In no instance was an item included in the final twenty that had not been chosen by at least two judges. In event of ties, selections involving the naive judge were discarded in favor of joint selections of the other two.

The 200 items selected for the ten scales were then reproduced and administered as described to the 131 subjects of Group A. After processing of the results as described, a product-moment correlation matrix was computed furnishing both item-item and item-total correlations for each scale for use in item selection.

Item scores were then factor analyzed. Due to the 135 variable limitation of the Burdsal program, it was necessary to split item variables into two samples. Division of the data into two samples with five scales each was considered, since in this way all items could be investigated with reference to the same factor. However, in view of the planned reanalysis of selected items and as a partial check on the stability and consistency of any factor structure shown, considering the large probability of chance clustering in such a small sample, it was decided to include half the items on all ten scales in each factor analysis.

The finding of factors defined primarily by items specific to a scale as described in the results section made possible further selection of items on a multiple criterion basis to decrease their number to 13 for each scale. Considerations in maintaining items were high factor loadings on the appropriate scale factor, high item-total correlations, and low item-item correlations. Since high loadings on the same factor would normally involve a high proportion of common variance reflected by high item-item correlations, the use of these

inconsistent criteria of necessity involved a degree of balance and compromise. The overall objective was to obtain sufficient heterogeneity for maximum ultimate validity while retaining sufficient internal consistency among items for minimal standards of reliability and factor structure.

The remaining 130 items were then again factored to insure that the scale factors found in the separate analyses were indeed parallel; to check on the efficiency of the item selection; to determine if all scales appeared as factors defined by scale items; and to provide a means of selection for the final 100 items to be used in the IBT.

On the basis of factor loadings in this analysis, final items were selected. In several instances items were moved from one scale to another on the basis of consistently higher loadings on the factor representing the other scale. In each case the appropriate item and scale correlations were examined to confirm the greater relevance of the item to the unexpected scale.

Since factor loadings were the primary criterion in this last selection, it became apparent that a balance of items with direct and reverse scoring could not be maintained. Although these were evenly divided on several scales, others had as much as a 3 and 7 division in different directions according to the individual scale. It was decided that greater exposure to bias from acquiescent tendencies would not be as harmful to the final instrument as would a loss of factor relevance for the items; therefore items were retained as dictated by factor loadings.

The final 100 items were then refactored to determine what modifications of factor structure had occurred as a result of the deletion of other items. Three items which dropped substantially in loadings were replaced with others having greater item-item and item-total correlations. According to the format description already given, items were then arranged so that item numbers would reflect scales. Care was taken to insure random arrangement of direct and reversed items and sufficient separation of items with similar overt content. A reproduction of the test as finally administered may be seen in the Appendix.



## Construct Validation

When measurement is attempted in a new domain where no external criterion for validation yet exists, it is necessary to establish validity of the instrument in terms of the relationships of scores to the constructs internally defined through the data itself. The most appropriate method of establishing construct validity is through factor analysis. Constructs measured by the instrument are defined by factors which can be replicated in other samples if they represent real, functionally unitary, psychological dimensions. If so, then validity of the instrument in the measurement of the construct becomes a function of the loadings or correlations with the factors of test scores. Since the factors themselves and the constructs they represent are most usually defined through qualitative analysis of the content of variables most highly loading the factors, this method of validation incorporates the concepts of both content and construct validity.

This method of validation was utilized with the IBT both to insure the distinctness and stability of the irrational beliefs in Ellis' system as constructs and to determine the extent to which the IBT was able to measure those constructs. Although the existence of factor structures defining the hypothesized constructs in one sample is comforting, the replication of these factors in a separate nonhomogenous sample provides a much more powerful basis for accepting construct validity. Since selection of items for a test based on factor structure in one sample of necessity incorporates not only the true, stable sources of variance common to the items but also chance correlations of items unique to the sample, it is normally expected that a certain amount of shrinkage and change in factor loadings will take place in replication attempts.

Therefore the procedure used in construct validating the IBT involved comparison of factor structures in both initial and cross validation samples, calculation of validity coefficients in both samples for comparison and determination of shrinkage, and the attainment of minimum acceptable coefficients in the cross validation group.

Validity coefficients for both groups were computed using the loadings of scale items on the factor representing each construct. As Humphreys (Guilford & Lacey, 1947) has shown, with items of uniform

difficulty the correlation of total scores with a criterion can be estimated by dividing the mean item-total correlation into the mean item-criterion correlation. This method was used for both samples, A and B. However, for sample A no item-total correlations were available since the only scale scores computed by special program included all 20 items per scale in the original administration. Therefore an estimate of item-total correlations was calculated using Richardson's method (1956) and the available item-item correlations.

The a priori decision as to the minimum acceptable validity for the IBT was difficult to make for several reasons: (1) As with reliability, less intrinsic validity should be expected of a research test than of a refined instrument in applied use. (2) The nature of the domain measured had not been sufficiently investigated to warrant good estimates of the maximum validity that could reasonably have been expected. Whereas measures of specific abilities or achievements may obtain validity coefficients from .80 to .95, the more complex the domain the more likely it is that validity will drop. Cronbach (1960) states that it is very unusual for a validity coefficient to rise above .60 outside these areas. Many personality, motivation, and interest measures in general use report construct validities as low as .40. (3) The small number of items per scale in the IBT required tolerance in setting minimum bounds for validity, since it is a function of test length. (4) Even experts in the field of measurement differ among themselves as to an acceptable level for validity. Established authorities such as Guilford (1954) and Nunnally (1967) avoid setting any absolute standards, but their high expectations are obvious. Those more concerned with practical problems of measurement in applied settings such as Guion (1965) seem willing to be satisfied with validities as low as .30 and .40. Cronbach (1960) states the general position succinctly by saying a good validity coefficient is one that is "the best you can get." The values stated in the research hypothesis were therefore a compromise between all views.

### Descriptive Statistics

Using standard computer programs as described, various descriptive statistics regarding IBT scales were derived from the scores of

sample B subjects. These included means, standard deviations, standard errors, maximum and minimum values, and coefficients of skewness and kurtosis. Results were surveyed for characteristics of importance in measurement.

### Reliability

The reliability of a test most commonly refers to homogeneity or internal consistency although quite often the term is also applied to calculations of stability and equivalency between forms. Both homogeneity coefficients and stability coefficients were calculated for the IBT.

In accordance with the suggestions of Guilford (1954) and Nunnally (1967), an absolute minimum homogeneity of .50 and a desired minimum of .60 was set as a goal of test construction, taking into account the research nature of the instrument and the expected scale length of only ten items.

The estimation of homogeneity was accomplished by two different methods. The first utilized a two way analysis of variance without replication of a matrix of item scores against subjects for each scale in accordance with the suggestions of Hoyt (1941). The second utilized mean item-item correlations in a Spearman-Brown formula with the multiple, "n," equal to the number of items in accordance to Guilford's suggestion (1954). Mean item-item correlations were calculated by Richardson's formula (1936) using mean item-total correlations.

It was decided not to calculate the more usual split-half reliability coefficients due to the difficulties involved in writing and checking special computer programs for processing and scoring the data in this manner. However, this decision was made realizing that higher values for reliability might have been obtained by that method. Hoyt's method is an extension of the rationale utilized in the Kuder-Richardson formula 20 (1937) and would therefore normally provide results much lower than split-half coefficients. Both methods used utilize assumptions of item equivalency; and as Wherry and Gaylord (1945) have shown, in the normal situation where actual items unevenly measure common factors, the resulting reliability value is biased in size. Therefore values obtained from both methods used were probably underestimates.

regression equation utilizing IBT scores. A multiple R was also computed for the total symptom score, using IBT scales as predictors.

In order to adequately investigate the hypothesis involving IBT scores and intelligence as measured by factor B of the 16PF, the total sample was placed into a t-test program and the IBT scores of those scoring one half standard deviation or more above and below the mean on factor B were compared for significant differences.

In order to determine if a significant difference in IBT scores existed between the general adult sample and the mental hospital sample, all IBT scores of the two groups were compared using the t-test program.

#### Demographic Variable Relationships

Age, sex, and education level variables were correlated with IBT scores, and the values were investigated for significance using standard tables.

In addition, the t-test program was used to investigate the significance of differences between mean scores of males and females and of high and low education groups on the IBT. For the latter test, variance was maximized by comparing those with two or more years of college with those who failed to complete high school.

## CHAPTER III

### RESULTS

#### Test Construction

In the two factor analyses done on the divided 200 item first administration, ten factors were extracted with both varimax rotation to orthogonal simple solution (Kaiser, 1956) and promax rotation to an oblique solution (White, 1962). The results were highly gratifying for an initial analysis. All scales were defined by factors in at least one of the two analyses with most being represented in both. The representation of scales by factors was much more definitive and unique in the varimax matrix than in the promax matrix. There were some factors which could not be identified through content analysis of loading items and which evidently represented chance clustering of items. In subsequent analyses, therefore, a greater number of factors were extracted than would be required to explain the scales in order to allow them to appear as factors if possible.

In the analysis of the 130 selected items 15 factors were extracted and rotated in the same manner. As in the previous analysis, item loadings were much more definitive of scale factors in orthogonal structure than in oblique solution. All scales were well defined by factors, with most of the items in each scale showing satisfactory correlations with the orthogonal factor representing the scale. The final selection of items was then made as described and these 100 items were used in determining the construct validity of scales for the initial sample.

#### Construct Validation

Even though the initial sample, Group A, was administered 200 items, only the items successfully passing all steps in selection were

considered in determining construct validity of the instrument in this first sample. In the factor analysis of final items, 15 factors were secured accounting for 86.6% of the total variance. Of these 15 factors, 10 were clearly identifiable by items of a specific scale. These 10 factors accounted for 73.2% of the total variance and 45.4% of the original communality estimated in all factors. The varimax matrix resulting from this factor analysis may be seen in the Appendix. Each of the 10 factors was clearly identified as representing one of the irrational belief scales as the result of relatively pure and consistent higher loadings of items unique to the scale on the factor. The mean loadings of scale items for each scale represented by a factor may be seen in Table 2. Also listed for each of the factors is the number

TABLE 2  
COMPARISON OF MEAN FACTOR LOADINGS OF IBT SCALE  
ITEMS IN TWO SAMPLES

Factor- Scale No.	Irrational Beliefs as Described by Resultant Behavior	Group A, N=131		Group B, N=427	
		Mean Loadings, Scale Items	Other Items L'd'g .225	Mean Loadings, Scale Items	Other Items L'd'g .225
1	Demand for approval	.628	15/90	.362	3/90
2	High self expectations	.413	8/90	.300	5/90
3	Blame proneness	.366	6/90	.324	3/90
4	Frustration reactive	.384	3/90	.248	5/90
5	Emotional irresponsibility	.401	7/90	.393	9/90
6	Anxious overconcern	.493	11/90	.428	15/90
7	Problem avoidance	.351	4/90	.354	2/90
8	Dependency	.411	7/90	.276	6/90
9	Helplessness	.378	5/90	.284	2/90
10	Perfectionism	.358	3/90	.328	1/90

of other items loading that factor with coefficients greater than .225, the approximate value for a .05 level of significance. Obviously a large proportion of the variance was extracted in factor 1 with consequent greater impurity of factor definition. It should be noted that no factor was pure in the sense that all scale item loadings were high with all nonscale items low. In all cases there were occasional nonscale items that loaded a factor more than some of the scale items, and at least half the scale factors had one or more items whose loadings were too low to be considered significant alone. However, these items were for the most part acceptable in view of the facts that (1) item-item correlations and item-total correlations initially were acceptable and indicative of shared communality with other scale items; (2) the small size of the sample severely inflated the possibility of spuriously low intercorrelations and resultant factor loadings as well as high ones; (3) it was doubtful that good simple structure and adequate rotation had been achieved due to the maximization of variance during rotation impartially increasing the stronger nonscale item loadings at the expense of several scale items with smaller loadings. As noted in the previous chapter, only three items of the 100 were replaced to increase validity, and these items are included in neither the mean item loadings in Table 2 nor the later reported coefficients of construct validity.

### Research Hypotheses

Research Hypothesis 1.-- As determined by factor analysis, the irrational beliefs enunciated by Ellis are sufficiently distinct in content and stable in structure to be measurable as separate constructs defined by factors which can be replicated in a separate nonhomogeneous population.

Although the very satisfactory factor structure obtained in the original validation sample provides strong evidence that the ideas or beliefs which the items were designed to measure are indeed separate constructs defined by factors, this evidence is not strong enough to stand by itself. There is always the possibility that in the distillation of items through repeated analysis true communality in small amounts may be lost while chance communality unique to the sample is

maximized. Such a possibility in the present study was greater than usual due to the exceedingly small number of subjects and the exceedingly large number of variables initially. For the validation of 200 items, Nunnally (1967) or Guilford (1954) would have recommended 2,000 subjects but would have accepted 1,000. Guion (1965) and many others used to working in applied settings with limited samples would have still insisted on at least 400, or two times the number of variables. Because of practical restraints and self-confident optimism resulting from the knowledge that well written and selected items with high intrinsic validity and reliability will shine like pearls in even a small sample, a goal of 250 subjects for initial validation was set in this study. As appears to be customary in such situations, a large part of this number were not available at the time of testing, causing a resultant N of 131. Replication was therefore necessary for any assurances that real constructs had been measured rather than carefully assembled artifacts.

The homogeneity of the sample also called into question the transferability of any valid factor structure found, so replication was necessary on a sample heterogeneous in as many respects as possible, particularly with respect to the initial sample. In order to attempt confirmation of the hypothesis, therefore, the IBT was administered to 427 subjects from heterogeneous groups as described and the resultant scores were factor analyzed.

In this analysis, 15 factors extracted 94.1% of the total variance. Again 10 factors were readily identified through the relative uniqueness of specific scale item loadings. These 10 factors accounted for 90.2% of the total variance and 70.2% of the original communality estimated in all the factors. As shown in Table 2, the mean loadings of scale items on the factors representing the same scales dropped substantially from those obtained in the original analysis, even though they remained in acceptable limits considering the larger N of the sample. In general, the relative purity of the factor structure was improved for scales, using the same absolute value for comparison. As in the preceding analyses, promax rotation into oblique solution obscured the cleaner factor-scale relationships seen in the varimax matrix. The latter may be seen in the Appendix.



On the basis of factor analysis of data from the cross validation sample with replication of factor structure, Research Hypothesis 1 was confirmed.

Research Hypothesis 2.-- As determined by factor loadings of scale items on factors defining the scales, construct validity of IBT scales will exceed a minimum acceptable value of .40.

In Table 3 may be seen construct validity coefficients for both the initial and cross validation samples. The values for the initial sample appear spuriously high, although how much too high is something that is not calculable. The inflation of these values is in all probability a function both of the process of boiling down items with uniqueness as well as true communality maximized and of failure to meet fully the assumptions of equivalency of items in the statistical

TABLE 3  
IBT CONSTRUCT VALIDITY COEFFICIENTS

Factor-Scale No.	Irrational Belief as Described by Resultant Behavior	Initial Validation Group A N=131	Cross Validation Group B N=427
1	Demand for approval	.946	.676
2	High self expectations	.850	.629
3	Blame proneness	.890	.747
4	Frustration reactive	.876	.561
5	Emotional irresponsibility	.931	.824
6	Anxious overconcern	.978	.802
7	Problem avoidance	.921	.714
8	Dependency	.957	.679
9	Helplessness for change	.958	.619
10	Perfectionism	.991	.737

procedures. The estimation of mean item-total correlation as the square root of mean item-item correlation according to Richardson's formula (1936) is an approximation at best. And if through lack of homogeneity in items this value is inflated, then Humphrey's formula (Guilford & Lacey, 1947) would be strongly affected.

However, the coefficients seen in Table 3 for the cross validation sample are based on direct item-total correlations and fall in the very satisfactory portion of the expected range. The large decrease in computed validities between the initial sample and the cross validation sample is to be expected for the reasons previously described. Considering the small N of the initial sample, the maintenance of coefficients at the high level shown for Group B is strong support for the IBT as a well validated instrument on the basis of constructs shown by factors. The requirements of Research Hypothesis 2 are well exceeded, and therefore this hypothesis was confirmed.

#### Descriptive Statistics

Table 4 gives descriptive statistics computed for all scales of the IBT and for total score. An unusual finding is that for most of the scales the mean for the total sample of 427 subjects is very close to the mean of minimum and maximum possible scores. The three means which do not conform to this are slightly lower, but not substantially so. On all scales it is possible for a subject to deviate as much as  $2\frac{1}{2}$  standard deviations from the mean in either direction. The variance is sufficiently large for adequate discrimination, yet not so much so that there is apt to be jamming at either end of the distribution. The latter observation is confirmed by actual maximum and minimum values of scores in the data. Only six of the twenty-two possible extreme scores were attained by anyone in the sample of 427 subjects. Since users of the test would be primarily concerned with discrimination between high scorers rather than low scorers, the positive skew of the score distribution on most scales is beneficial and desirable. In two distributions there is very mild negative skew, and only scale 8 has any substantial degree of negative skew.

In general it may be said that the descriptive statistics for all scales show satisfactory and acceptable values.

TABLE 4

DESCRIPTIVE STATISTICS FOR IBT SCALES  
N = 427

IBT Scale	Mean	Std. Dev.	Std. Error	Max. Value	Min. Value	Skew- ness	Kur- tosis
1	31.41	6.69	.324	50	10	.130	-.069
2	31.03	5.85	.283	50	13	.273	.382
3	30.11	5.64	.273	46	14	-.055	-.012
4	31.16	5.40	.262	47	12	.034	.181
5	25.07	5.91	.286	44	10	.375	.136
6	30.94	7.19	.348	50	11	-.058	-.366
7	25.88	6.16	.299	43	10	.202	-.382
8	30.79	4.98	.241	44	11	-.280	.354
9	28.05	6.22	.301	47	13	.175	-.162
10	27.09	5.87	.284	46	12	.261	.178
Full	291.54	31.73	1.537	415	180	.143	.810

Reliability

Research Hypotheses

Research Hypothesis 3.-- The IBT will have sufficient homogeneity within scales to provide a minimum acceptable internal consistency reliability of .50 in any scale and a mean reliability of .60 for all scales.

As previously discussed, the two methods utilized in the study to provide estimates of internal consistency reliability both tend to give underestimates under average conditions compared to a split-half correlation corrected by the Spearman-Brown formula. Despite this fact, it may be seen from Table 5 that applying both methods to all

TABLE 5

RELIABILITY COEFFICIENTS FOR IRRATIONAL  
BELIEFS TEST (IBT), N=427

IBT Scale	Irrational Beliefs as Described by Resultant Behavior	Homogeneity Hoyt's Method	Homogeneity Guilford's Method	Stability Test-retest N=52
1	Demand for approval	.724	.801	.830
2	High self expectations	.623	.747	.872
3	Blame proneness	.566	.714	.775
4	Frustration reactive	.550	.712	.675
5	Emotional irresponsibility	.621	.746	.754
6	Anxious overconcern	.724	.798	.856
7	Problem avoidance	.659	.745	.827
8	Dependency	.450	.662	.857
9	Helplessness	.589	.726	.676
10	Perfectionism	.585	.714	.676
Full	Irrational Beliefs in General			.921
	Mean of Individual Scales	.609	.737	.796

scales only yielded one value failing to meet the hypothesis.

Using Hoyt's method with analysis of variance, the mean reliability of scales was .609 with a range from .450 to .724. Only one scale was below .550. Using Guilford's method and employing item-item correlations, homogeneity values were found from .662 to .801 with a mean over scales of .737. Scales 1 and 6 were shown to be the most reliable by both procedures, while scale 8 was found to have the least internal consistency.

Although it is more probable that other methods of estimating reliability would approach the higher values rather than the lower, a conservative estimate would allow an average of the two to be the closest estimate of actual homogeneity. The lowest reliability

TABLE 6

PEARSON PRODUCT-MOMENT CORRELATIONS<sup>a</sup> BETWEEN IBT SCALES AND MALADJUSTMENT SYMPTOMS<sup>b</sup>, N=427

No.	Maladjustment Symptom	1	2	3	4	5	6	7	8	9	10	Full
1.	I worry	348	315	096	350	139	521	227	048	292	-038	454
2.	I feel unhappy	300	271	125	281	254	396	305	-053	338	-054	427
3.	I feel inadequate and inefficient	304	298	132	201	137	337	269	080	273	-015	394
4.	I become depressed and blue	313	338	132	276	192	432	275	-014	332	-047	440
5.	I get angry easily	095	304	237	301	084	256	142	-012	193	-044	298
6.	I would like to be different from the way I am	306	289	182	287	174	393	288	075	354	-033	451
7.	I have guilty feelings	246	267	064	205	134	353	255	-014	312	-103	542
8.	I live with a lot of anxiety	262	328	138	200	114	461	174	022	354	-082	391
9.	I don't like myself very much	283	295	119	219	156	357	231	-104	351	-062	508
10.	I tend to be tense and nervous	303	364	091	302	133	406	230	005	324	020	428
11.	I have trouble doing things I know I need to do	208	280	079	191	054	325	431	004	273	-026	568
12.	My emotions give me trouble	286	306	098	281	092	430	210	022	347	-088	393
13.	Frustrations "bug" me	265	314	195	360	079	458	225	-021	326	-099	414
14.	I tend to be pessimistic	221	353	151	246	139	288	225	-051	302	064	355
15.	My nerves bother me	280	309	073	235	138	397	188	000	344	-047	397
16.	I don't have enough confidence	282	234	079	181	118	364	289	016	307	-031	365
17.	My problems seem to keep repeating themselves	218	245	163	193	171	415	226	-056	381	066	401
18.	Life is not enjoyable or fun	203	320	191	122	279	317	239	-144	407	071	386
19.	I feel bad physically	182	257	116	186	182	310	186	-033	309	-078	349
20.	I don't feel close to other people	096	270	190	096	109	270	124	-182	266	-042	241
21.	Life seems dreary and difficult	260	304	237	270	310	423	263	-080	400	010	471
22.	I feel a lot of resentment	158	299	253	232	226	355	176	-068	353	-067	371
23.	I become upset easily	255	317	172	358	152	418	189	043	302	-078	415
24.	I find it hard to get interested in things	203	293	270	165	245	305	339	008	321	093	435
25.	I feel like giving up	232	324	231	172	200	366	277	-050	396	-003	422
	Summated Symptom Scores	383	470	237	370	247	586	373	-033	510	-037	611

<sup>a</sup>Decimals omitted; Significance values for this N: .093 @ .025 level, .127 @ .005 level, .160 @ .0005 level<sup>b</sup>Scaling: (1) almost never (2) occasionally (3) some of the time (4) much of the time (5) most of the time

## Research Hypotheses

Research Hypothesis 5.-- There will be a significant positive functional relationship between irrational beliefs as measured by the IBT and the self-report of maladjustment symptoms.

Correlation coefficients between all IBT scores and all items of the Symptom Measure as well as total score are shown in Table 6. It is evident that with the exception of IBT scales 8 and 10, highly significant relationships existed as hypothesized. Every item in the Symptom Measure correlated with IBT scales 2, 6, 9, and total score with values exceeding by far the .0005 level of significance. All but a few items correlated with scales 1, 4, 5, and 7 in the same manner. Only scales 8 and 10 appear to have no association with admitted symptomatology beyond occasional chance correlation.

However, inspection of the regression equation in Table 7 with symptom admission predicted by IBT scales shows that both 8 and 10 were useful as a negative function in prediction. The explanation for this of course lies in the fact that their value in prediction rises if they share less common variance with other scales. Referral to the correlation matrix of scores in the Appendix will confirm that relatively smaller correlations with other scales are presented by these two.

The very high multiple R of .717 between total symptom score and IBT scales strongly confirms the research hypothesis and the underlying rationale of a direct relationship between psychiatric complaints and incidence of irrational beliefs. This finding is enhanced even further by the fact that despite the anchoring of IBT scales on orthogonal factors, eight of them were required to establish this multiple correlation. This implies the inherent validity of the instrument as a combination of measures well suited for prediction or explanation in the area of emotional disturbance and maladjustment.

On the basis of both correlations with individual IBT scales and multiple correlation using the scales as predictors, the relationship hypothesized was shown to exist for all scales except 8 and 10.

Scrutiny of correlations in Table 6 relative to each other provides insight into the dominant symptoms of persons with specific irrational beliefs. For example, with Belief 1 a person tends

really to worry, feel inadequate and unhappy, and easily become tense or depressed. Yet he has little inclination to anger easily, be resentful, or feel alienated from others; people and their approval are too important to him. On the other hand, those high on Belief 3 who believe in blame and guilt show anger easily, are resentful, lack interest, find life dreary, and often feel like giving up. Many of the outstanding symptoms have high face validity for the irrational belief correlating most highly. For example, the highest correlation for Belief 7, problem avoidance, is the symptom of lack of willpower.

Research Hypothesis 6.-- There will be a significant positive functional relationship between irrational beliefs as measured by the IBT and scales C-, H-, L+, O+, Q3-, Q4+ of the 16PF.

In Table 8 may be seen correlation coefficients computed between all the variables involved in this hypothesis, with 16PF factors arranged in the general order of their usual clinical significance. Immediately apparent is the repetition of the pattern found with symptoms as criteria. IBT scales 8 and 10 showed no significant correlations or even steady trends with these 16PF scales, while most of the correlations involving other IBT scales were highly significant beyond the .0005 level. Both scale 6 and total score showed consistent very high correlations with all clinical personality factors, with 2, 4, 7, and 9 following closely. Of the 16PF factors, Q3 was less consistent in correlating with IBT scales than any other, and it had the lowest correlation with total score.

As portrayed in Table 7, multiple R's of criteria 16PF scales with IBT scales as predictors ranged from .432 to .630, with Q4+, O+, and C- having the highest correlations with the IBT. Inspection of the matrix of coefficients in the regression equations shows the varying contributions of differing irrational belief measures to the prediction of the anxiety component factors and illustrates the fact that all the philosophies measured by the IBT shared some common variance with the elements of the second-order anxiety factor.

Despite the general overall positive relationship of IBT scores to these indices of emotional disturbance and maladjustment, excepting scales 8 and 10, it is evident that certain scales were aligned more closely with them than others. Scale 6 had consistent high correla-

TABLE 8

CORRELATIONS BETWEEN IBT SCORES AND 16PF  
INDICES OF EMOTIONAL DISTURBANCE  
N=427

IBT Scale	16PF Clinical (Anxiety) Factors in order of general clinical significance					
	O+	Q4+	C-	Q3-	L+	H-
1	.350	.315	.275	.128	.137	.284
2	.356	.383	.317	.228	.303	.361
3	.215	.189	.194	.108	.279	.219
4	.350	.467	.295	.296	.257	.180
5	.178	.082	.186	.028	.046	.152
6	.515	.527	.421	.335	.341	.326
7	.349	.299	.263	.268	.235	.333
8	.054	.059	-.053	-.027	-.047	.029
9	.387	.273	.283	.174	.304	.273
10	-.065	-.091	-.098	-.047	.012	.006
Full	.527	.491	.411	.293	.356	.422

Note: Significance values for this N are .115 @ .01 level, .127 @ .005 level, and .160 @ .0005 level for a one-tailed test.

tions with every clinical personality factor and was the only IBT scale besides 7 which contributed to every multiple correlation with them. In some cases it correlated higher with them than did total score.

The construct similarity between the second-order questionnaire factor of anxiety and IBT scale 6 was well demonstrated in the factor analysis wherein not only IBT items but also IBT scale scores and 16PF scores were entered as variables. One of the purposes of this analysis along with item comparison was to replicate if possible the usual 16PF second-order factor structure and to compare factor correlations of these and IBT factors after oblique rotation. However, it was found



from the varimax matrix after orthogonal rotation that both IBT 6 and the anxiety factors from the 16PF loaded the same factor. Comparison of scale item loadings on this analysis with those obtained in the previous factoring of items only revealed the same relative values, indicating that the 16PF clinical items had "lined up" with the scale 6 factor due to a high degree of common variance. However, upon oblique rotation in the promax phase of the factor analysis program, it was found that even though IBT 6 loadings had become less definitive in accordance with previous experience, 16PF anxiety component loadings had completely disappeared as a pattern. It was therefore clear that IBT 6 and the second-order anxiety factor were not identical, even though there was a high correlation involved.

On the basis of the results shown in Tables 7 and 8, the hypothesis was confirmed with the exception of IBT scales 8 and 10 which portrayed no significant relationships with 16PF clinical scales.

Research Hypothesis 7.-- There will be no significant functional relationship between irrational beliefs as measured by the IBT and scales A, E, F, G, I, M, N, Q1, and Q2 of the 16PF.

Computed correlation coefficients between the 16PF scales listed above and all IBT scores are shown in Table 9. At first, the absence of .500 to .600 correlations as shown by clinical factors leaves the impression that few significant relationships existed. But upon closer inspection it may be seen that of the 99 correlations involved, 9 of them were significant at the .05 level, 5 at the .02 level, 16 at the .01 level, and 17 at the .001 level for a total of 47 out of 99. Therefore the hypothesis could not be maintained.

On many of these primary nonclinical personality factors it was clear that steady relationships were maintained with irrational ideas in general. For example, A- (reserved), E+ (assertive), F- (sober), N- (artless), and Q2- (group dependent) all tended to correlate positively with IBT scores. On the other hand, some traits such as G (expedient vs. conscientious), I (tough-minded vs. tender-minded), and M (practical vs. imaginative) tended to have positive relationships with some IBT scales and negative relationships with others.

The more specific relationship of IBT scales to certain primary

TABLE 9

PRODUCT-MOMENT CORRELATIONS<sup>a</sup> BETWEEN IBT SCALES  
AND NONCLINICAL 16PF FACTORS, N=427

IBT Scale	16PF Factors									
	A	B	E	F	G	I	M	N	Q1	Q2
1	-.049	-.048	-.111	-.097	.038	.079	.022	-.155	-.151	-.169
2	-.160	-.102	.118	-.175	-.096	-.012	.070	-.070	-.048	.007
3	-.137	-.192	.093	-.138	.033	-.188	-.101	-.005	-.142	-.047
4	-.052	.060	.106	-.070	-.048	.101	.157	-.157	-.032	.005
5	.014	-.053	.031	-.080	-.098	-.008	-.084	-.046	.141	-.036
6	-.156	-.099	.059	-.131	.065	.047	.036	-.164	-.174	-.054
7	-.097	-.016	.048	-.060	-.329	.089	.055	-.268	.042	-.005
8	.120	-.013	-.153	.042	.148	.181	-.092	-.126	-.165	-.185
9	-.171	-.183	.124	-.132	-.149	-.095	.078	-.137	.028	-.032
10	.020	-.096	.007	-.060	.116	-.092	-.166	.035	-.062	-.076
Full	-.135	-.144	.063	-.176	-.093	.017	.000	-.211	-.108	-.111

<sup>a</sup>Decimals preceding coefficients omitted. Significant values for this N (2-tailed test): .093 @ .05 level; .127 @ .01 level; .160 @ .001 level.

traits of personality was well demonstrated by the regression equations of Table 10, where IBT scales were used to predict nonclinical 16PF factors. In contrast to the number of scales used to build a multiple correlation with those traits loading anxiety, a much smaller number of IBT factors were used to predict the other 16PF scales. The multiple R's were more moderate than those involved with clinical scales, yet without exception they were significant at less than the .01 level.

Table 11 provides concurrent validation multiple R's done in the reverse manner with 16PF scales used to predict each IBT score in turn. The complex interaction of a number of primary factors is well illustrated in this table, as 10 and more 16PF scales contributed significantly in the prediction of IBT scores. All multiple correlations shown were highly significant with the inclusion of both clinical and nonclinical 16PF scales in the regression equations. The multiple R

TABLE 10

MULTIPLE CORRELATIONS<sup>a</sup> OF IBT SCALES WITH NONCLINICAL 16PF FACTORS  
N=427

Criterion Variable	R	Regression Equation Coefficients										Equa- tion Con- stant
		IBT 1	IBT 2	IBT 3	IBT 4	IBT 5	IBT 6	IBT 7	IBT 8	IBT 9	IBT10	
16PF A	.272			-.055		+.058	-.051		+.089	-.077		+22.089
16PF B	.261			-.059	+.040					-.048		+ 9.582
16PF E	.288	-.120	-.086		+.078				-.089	+.075		+24.354
16PF F	.200		-.123	-.084								49
16PF G	.398	+.041						-.197	+.090		+.074	+2.1638
16PF I	.321			-.118	+.080			+.069	+.119	-.059		+17.738
16PF M	.294			-.069	+.097	-.056			-.058	+.072	-.064	+27.502
16PF N	.317				-.059			-.107	-.058.			+27.006
16PF Q1	.336	-.037		-.078	+.042	+.086	-.071		-.076	+.037		+22.951
16PF Q2	.241	-.086	+.045						-.098			+24.859

<sup>a</sup>Stepwise regression terminated at an F to enter or remove significant at the .05 level.

TABLE 11

MULTIPLE CORRELATIONS<sup>a</sup> OF 16PF FACTORS WITH IBT SCALES AS CRITERIA  
N=427

Criterion Variable	R	Regression Coefficients of 16PF Scales <sup>b</sup>															Con- stant <sup>b</sup>	
		O+	Q4+	C-	Q3-	L+	H-	A+	B+	E+	F+	G+	I+	M+	N+	Q1+		Q2+
IBT 1	.485	+294	+255			+256			-132	+263							-477	+31515
IBT 2	.513		+205			+195	+370		+274	-101							-219	+31924
IBT 3	.467			+115		+281	+210		-333	+242	-131	+145	-223	-177		-196	-196	+47156
IBT 4	.513	+141	+407		+221			+274				+241		+111				+11359
IBT 5	.335	+247	-109	+281			+101							-318		+427		+32147
IBT 6	.643	+371	+384	+204	+289	+160	+134	-186				+316		-170		-148	-196	+32082
IBT 7	.523	+082			+177	+134	+355					-391			-317	+146	-217	+51183
IBT 8	.391		+134	-153					-132			+220	-268	-113	-264	-154	-238	+32077
IBT 9	.493	+372				+193	+234		-339	+213	-104		-181			+157	-211	+26548
IBT 10	.254			-148					-291	+126	-172	+115		-256			-163	+34076
IBT Full	.666	+1629	+1054	+772		+1047	+1985		+820			+957		-1035	-761		-1813	+312991

<sup>a</sup>Stepwise regression terminated at an F to enter or remove significant at the .05 level.

<sup>b</sup>Decimals omitted; all values given should be multiplied by .001.

of 16PF traits with IBT total score was .666.

Research Hypothesis 8.-- There will be a significant negative functional relationship between irrational beliefs as measured by the IBT and intelligence as measured by scale B of the 16PF.

The correlations between scale B of the 16PF and the various IBT scores are shown in Table 9. Significant values were obtained only for the total score and five of the scale scores, with three of these having very mild significance levels around .025. An indisputable relationship appeared to exist only with scales 3 and 9 and the total score. Scale 4 reversed the hypothesized relationship direction.

Furthermore, inspection of Table 11 illustrates that factor B entered into the prediction of IBT scales only four times, one of these being for scale 4. The greatest overall contribution to prediction seemed to be for IBT 10, with a relatively large weight also being given B in predicting IBT 3. Factor B did not enter into the prediction of IBT total score at all.

Table 10 lists a multiple correlation coefficient between factor B and the IBT scales of .261, significant at the .01 level. However, further inspection illustrates that only three IBT scales significantly affected this prediction of B; and again IBT 4 was one of the three and varied contrary to the hypothesis.

Table 12 provides the results of the comparison between groups definitely discriminated on the basis of intelligence. It may be seen here that only IBT scale 9 highly discriminated the two groups, with a  $t$  significant at the .0015 level. Scale 3 approached the .01 level, while scale 6 was within the .05 level of significance. None of the other scores were significantly different between the two groups.

In view of the fact that the reliability and validity of factor B are so low compared to ordinary measures of intelligence, it is probable that the  $t$ -test analysis shown in Table 12 was the most reliable test of the hypothesis. Therefore with the exception of IBT scales 9 and 3 and to some extent 6, the hypothesis was not supported.

The intelligent person seemed to differ in irrational beliefs from those less bright only in the tendencies to consider himself less bound by the past, to condemn and blame less, and to be less anxious

TABLE 12.

COMPARISON OF IBT SCORES IN HIGH AND LOW  
INTELLIGENCE GROUPS AS MEASURED BY  
16PF SCALE B  
GROUP H WITH SCORES GREATER THAN .5 S.D. ABOVE MEAN, N=59  
GROUP L WITH SCORES LOWER THAN .5 S.D. BELOW MEAN, N=64

IBT Scale	Group	Mean	Std. Dev.	F	Sig. Lvl.	t	Sig. <sup>a</sup> Lvl.
1	H	31.31	6.80	1.10	.726	-0.51	.306
	L	31.92	6.50				
2	H	30.42	6.19	1.32	.280	-1.35	.090
	L	31.84	5.38				
3	H	29.32	6.18	1.55	.090	-2.28	.013
	L	31.64	4.96				
4	H	31.10	5.96	1.23	.419	0.85	.201 <sup>b</sup>
	L	30.23	5.37				
5	H	26.29	6.89	1.47	.139	0.46	.326 <sup>b</sup>
	L	25.77	5.69				
6	H	29.37	7.80	1.32	.281	-1.92	.029
	L	31.91	6.78				
7	H	27.41	5.81	1.19	.510	0.43	.336 <sup>b</sup>
	L	26.94	6.33				
8	H	30.37	6.25	1.16	.566	-0.02	.494
	L	30.39	5.80				
9	H	27.02	6.41	1.40	.192	-3.05	.0015
	L	30.30	5.42				
10	H	27.24	6.20	1.26	.378	-0.95	.173
	L	28.25	5.53				
Full	H	289.65	35.04	1.26	.372	-1.56	.062
	L	299.19	31.22				

<sup>a</sup>One-tailed test

<sup>b</sup>Reverse relationship to that hypothesized

and preoccupied with fears. Since these are only three of the ten areas of irrational philosophies measured by the instrument, it would appear that even though brightness may assist a person in being more rational, especially in some ways, it does not offer a high degree of protection against the possession of the irrational beliefs listed by Ellis.

Research Hypothesis 9.-- The IBT will be a sufficient discriminator of mental disturbance that patients in a mental hospital will attain significantly higher scores than will subjects from a general adult population.

The results of comparing the scores of the general adult group in sample B and the mental hospital inpatients in the sample are given in Table 13. In general, the hypothesis was confirmed at highly significant levels. The only exceptions involve scales 1, 4, and 8, with the latter two providing almost no difference in mean scores. The contrast between the results on these scales compared to the others is striking and is particularly surprising in view of the fact that both scales 1 and 4 showed high correlations with symptomology and the components of anxiety.

Research Hypothesis 10.-- There will be a significant negative functional relationship between irrational beliefs as measured by the IBT and age of the subjects.

The correlations between IBT scores and age may be seen in Table 14. With the exception of IBT scale 6, this hypothesis was not sustained. Even the correlation of scale 6 with age was very moderate, barely significant at the .025 level with a one-tailed test. All other scales with the exception of scale 5 showed minor correlations not even indicative of a trend. Scale 5 reversed the hypothesized direction of the relationship with a correlation that would have been significant at the .05 level if the hypothesis had been nondirectional.

Research Hypothesis 11.-- Females will score significantly higher in irrational beliefs as measured by the IBT than will males.

Correlations between IBT scores and sex are shown in Table 14. Except for IBT scales 1, 4, and 8 the hypothesis was not maintained.

TABLE 13

COMPARISON OF IBT SCORES FOR A MENTAL HOSPITAL (H)  
 SAMPLE, N=72, AND A GENERAL ADULT (GA)  
 SAMPLE, N=177

IBT Scale	Group	Mean	Std. Dev.	F	Sig. Lvl.	t	Sig. <sup>a</sup> Lvl.
1	H	32.05	6.88	1.06	.763	1.04	.156
	GA	31.05	6.69				
2	H	33.00	5.98	1.24	.269	3.29	.0005
	GA	30.32	5.38				
3	H	32.32	5.92	1.24	.258	3.57	<.0005
	GA	29.45	5.31				
4	H	30.82	6.30	1.51	.031	-0.01	.498
	GA	30.83	5.13				
5	H	27.25	6.66	1.42	.070	3.50	<.0005
	GA	24.14	5.59				
6	H	32.14	7.91	1.21	.324	2.60	.006
	GA	29.34	7.19				
7	H	26.97	6.36	1.26	.227	3.01	.0015
	GA	24.38	5.67				
8	H	30.78	5.26	1.20	.349	-0.04	.484
	GA	30.81	4.80				
9	H	31.49	6.02	1.12	.544	6.25	<.0005
	GA	26.31	5.68				
10	H	29.17	5.50	1.28	.242	3.11	.001
	GA	26.68	6.22				
Full	H	305.97	35.80	1.56	.020	4.79	<.0005
	GA	283.29	28.66				

<sup>a</sup>One-tailed test



TABLE 14

CORRELATIONS BETWEEN IBT SCALES  
AND DEMOGRAPHIC VARIABLES  
N=427

IBT Scale	Sex M- F+	Education Level	Age
1	.143	-.080	.026
2	-.067	-.105	.042
3	-.160	-.228	.017
4	.140	-.029	-.018
5	-.100	-.075	.099
6	.075	-.202	-.102
7	-.046	-.073	-.060
8	.158	-.030	-.027
9	-.119	-.207	.021
10	-.176	-.183	.036
Full	-.028	-.234	.004

These three scales showed correlations significant beyond the .005 level. Only one other scale even correlated in the expected direction, however, and on four of the remaining seven scores men were significantly higher than women.

In further confirmation of these findings, the results of a t-test of the difference between means is shown in Table 15. Many of the computed probabilities were highly encouraging until the negative t values were noticed.

It is apparent that a significant difference did exist between IBT scores made by men and women but that the direction of the relationship was specific to each scale rather than there being a general trend for the whole test.

Based on the results shown in Tables 14 and 15, it appeared that

TABLE 15

COMPARISON OF IBT SCORES BY MALES (N=211)  
AND FEMALES (N=216)

IBT Scale	Sex	Mean	Std. Dev.	F	Sig. Lvl.	t	Sig. <sup>a</sup> Lvl.
1	F	32.38	7.08	1.34	.036	3.04	.001
	M	30.43	6.13				
2	F	30.60	6.23	1.36	.026	-1.56	.060 <sup>b</sup>
	M	31.48	5.37				
3	F	29.14	6.00	1.40	.015	-3.66	<.0005 <sup>b</sup>
	M	31.10	5.07				
4	F	31.91	5.53	1.14	.333	2.93	.002
	M	30.40	5.17				
5	F	24.43	6.17	1.23	.129	-2.30	.012 <sup>b</sup>
	M	25.73	5.56				
6	F	31.46	7.56	1.25	.109	1.51	.066
	M	30.41	6.77				
7	F	25.57	6.12	1.03	.822	-1.03	.153 <sup>b</sup>
	M	26.19	6.21				
8	F	31.63	5.04	1.11	.449	3.57	<.0005
	M	29.93	4.78				
9	F	27.33	6.64	1.37	.024	-2.43	.008 <sup>b</sup>
	M	28.78	5.68				
10	F	26.01	5.96	1.14	.352	-3.91	<.0005 <sup>b</sup>
	M	28.20	5.59				
Full	F	290.45	33.60	1.28	.079	-0.72	.239 <sup>b</sup>
	M	292.65	29.75				

<sup>a</sup>One-tailed test

<sup>b</sup>Reverse relationship from that hypothesized

women were more inclined to perceive approval as a need, to over-evaluate unpleasant events, to worry and be anxious, and to not be self-directing. On the other hand, men were more inclined to set high standards for themselves, to be blamers, to reject responsibility for their emotions, and to be perfectionistic.

As can be seen, total scores on the IBT were not significantly related to sex, since the sex effect in the various scales tended to cancel out in the summative scoring.

Research Hypothesis 12.-- There will be a significant negative functional relationship between irrational beliefs as measured by the IBT and education level of the subjects.

On the basis of the correlation coefficients between IBT scales and education level in Table 14, the hypothesis was confirmed with significance at the .05 level for half the IBT scales and the total score, with all the others correlating nonsignificantly but in the predicted direction.

A t-test of the difference in means between high and low education groups as shown in Table 15 was even more definitive. Significance at the .0005 level was calculated for scales 3, 6, 9, and 10 as well as total score. Only scales 4 and 8 failed to show strong trends toward significance.

TABLE 16

COMPARISON OF IBT SCORES IN TWO GROUPS  
 DIFFERING IN EDUCATION LEVEL:  
 GROUP H (N=157) HAVING COMPLETED TWO OR MORE YEARS OF COLLEGE  
 GROUP L (N=95) NOT HAVING COMPLETED HIGH SCHOOL

IBT Scale	Group	Mean	Std. Dev.	F	Sig. Lvl.	t	Sig. <sup>a</sup> Lvl.
1	H	30.43	6.83	1.18	.384	-1.49	.069
	L	31.68	6.29				
2	H	30.04	6.51	1.47	.045	-2.35	.010
	L	31.82	5.37				
3	H	28.29	5.56	1.04	.838	-5.19	< .0005
	L	31.99	5.45				
4	H	30.96	5.48	1.14	.467	-0.02	.491
	L	30.98	5.86				
5	H	24.58	6.15	1.04	.831	-1.57	.059
	L	25.85	6.27				
6	H	28.73	7.33	1.03	.886	-3.33	.0005
	L	31.87	7.22				
7	H	25.22	6.35	1.05	.797	-1.13	.132
	L	26.17	6.50				
8	H	30.85	5.52	1.46	.048	-0.11	.456
	L	30.93	4.57				
9	H	26.34	6.23	1.01	.958	-4.06	< .0005
	L	29.64	6.26				
10	H	26.00	5.81	1.16	.446	-4.05	< .0005
	L	28.93	5.40				
Full	H	281.44	33.21	1.12	.548	-4.42	< .0005
	L	299.86	31.34				

<sup>a</sup>One-tailed test

## CHAPTER IV

### DISCUSSION

#### Evaluation of the Irrational Beliefs Test

As initially stated, the primary purpose of this study was to validate as measurable constructs the ideas Ellis has proposed as irrational beliefs and to develop a written instrument sufficiently reliable and valid for research purposes to measure the extent to which persons hold these irrational beliefs. On the basis of the data presented, it appears that this goal has been successfully met. Every research hypothesis set up to qualify the attainment of this purpose was confirmed. IBT items have been successfully shown to measure these beliefs as constructs defined by replicable factors and all the test characteristics including score distributions, homogeneity reliability, stability reliability, and construct validity exceeded expectations. In fact, in this research instrument these characteristics have been found to surpass those of many instruments of equal length now on the market and in applied use.

These findings alone show that the IBT can be used in further research involving irrational beliefs, thereby providing a research tool or aid not before available. In addition, however, the findings of substantial relationships with clinical criteria indicate that the IBT can be used effectively as a clinical instrument. Exploratory clinical use of the test not incorporated as a part of this study has shown many advantages offered by it. Like other clinical instruments, it provides an economical and simple shortcut to greater understanding of the nature of a patient's problems. It is nonoffensive and non-threatening. Results are intelligible and easily explainable to the subject and thereby offer an additional, more objective, external confirmation of material presented by the therapist. It also affords a means of objectively measuring progress in therapy.

Despite the present usefulness of the instrument as developed, however, a number of possible improvements are also suggested by the data from the study. Since many scales contain items that do not measure as well as desired, additional possible items should be gathered, administered to a sufficient sample together with the best of the present items, and statistically investigated in the same manner as the present study to furnish a larger item pool. Not only may weaker items be replaced, but the scales may be lengthened or expanded to two equivalent forms in this manner.

Work should be done to improve the presentation format, both to eliminate confusion in responding by the subjects and to provide the most simple method of hand scoring for the benefit of the user.

As discussed elsewhere, additional research should be done into the relationship of scales which are deviant in some respects to obtain maximum usefulness from test information. Included should be efforts to determine if greater discrimination and prediction could be obtained through certain combinations of scores.

Studies should also be run to determine how much reliability and validity would be gained or lost through use of 2, 3, or 6 position scaling instead of the present 5, taking into account other considerations should as ease in scoring and decrease in response bias of one kind or another.

In short, even though the research instrument constructed in the study exceeded expectations, like any development it should continue to be improved for maximum usefulness.

### Questions Raised by the Data

#### IBT Scales 8 and 10

These scales deviated substantially from the pattern shown by all other scales in correlating with indices of anxiety and emotional disturbance. No relationships to these criteria were found for scales 8 and 10. It is obvious on the basis of test statistics that these scales operated sufficiently well in measurement, although scale 8 did not achieve as much reliability as the others. It could be possible that this deviancy arises from partial error in the theory underlying

and others through rose-colored glasses. His favorite defense mechanism is repression. This is often the person who not only does not admit his own weaknesses but does not even see them. It is easy to see how this type of person can get into severe behavioral difficulties without facing reality honestly enough to incur anxiety and emotional turmoil.

The probability is that these scales do measure irrational beliefs which either lead directly to maladjustment or at least lead to greater exposure to problems without the more common problems of symptoms and anxiety. Evidently if these people are subject to anxiety they have learned to handle it through repression or other effective means. This possibility is of course only conjecture, but it should be investigated in future research with the IBT by validating scores on these scales against other external criteria of maladjustment not so highly connected with anxiety and against established instruments providing measures of repression and other defense mechanisms, such as the Defense Mechanism Index (Sweeney, 1964).

#### Nondiscriminating Scales for Mental Patients

A very unusual finding involved the failure of scales 1, 4, and 8 to differ substantially in normals and mental patients, while all other scales showed extremely significant differences. Is there something about the person with Irrational Beliefs 1 and 4 that keeps him out of the hospital, despite high anxiety, emotional turmoil, and realization of symptoms? Or is there something about the institutional environment that tends to modify the philosophic structure of the patient? A number of approaches could be taken to this problem and a number of research avenues are suggested by it, the most obvious being the testing of new arrivals and chronics in a patient population.

One interesting clue for additional research is provided by content analysis of the beliefs which do and do not discriminate. Those beliefs which are held the same in a general population as in a mental patient sample all have a common element in that they all involve the self-definition of desirable situations as life demands or needs, with these demands pertaining to external elements such as approval and love from others, desired situations, and a sense of

external support. This may be a neurotic core that leads to much unhappiness and emotional turmoil without the severity of mental illness that leads to hospitalization.

Even though Belief 2 also involves this aspect of demanding rather than preferring, the basic involvement here is with oneself, with overly high standards and inner goals. The content of other highly discriminating beliefs is also more personalized than externally oriented. Even the blaming and condemnation of Belief 3 may be turned primarily inward. So it may be that coping with internal stress is more likely to bring someone into the hospital than evaluating and working with external problems. Inspection of the content of the irrational beliefs providing the greatest discrimination shows the presence of highly dissonant areas involving high expectations and demands from oneself while at the same time abdicating responsibility for one's feelings and behavior. This might be more simply expressed as "I have to and I can't," incompatible and irreconcilable beliefs that would place anyone under severe stress if he accepted both simultaneously.

#### Irrational Beliefs and Age

The only IBT scale that showed even a mild relationship with age as expected was scale 6. This finding was at least consistent with the rationale of the hypothesis, since anxiety has been shown to decrease with age and scale 6 is the highest IBT correlate of anxiety. If, as Ellis believes, irrational beliefs are a contributing cause of anxiety and disturbance, then the possibility is suggested by the findings that since these beliefs do not seem to decrease with age, much of the decrease in anxiety and disturbance with age must be attributed to suppressor variables, more adequate defenses, and controls which result from life experience. This explanation would be consistent with the interactive view of behavior as being multiply determined and does not negate the possible role of irrational philosophies in emotional problems.



Intelligence, Education, and Irrational Beliefs

Another surprising finding involved a low degree of inverse correlation between IBT scores and a measure of intelligence with a high inverse relationship between the IBT scores and education level. The contrast between the two supposedly highly correlated areas is striking. Obviously any relationship between education and decreasing incidence of irrational philosophies cannot be explained as an artifact resulting from higher intellectual ability. The most reasonable explanation seems to be that the introjection of values and beliefs from the general milieu which so greatly shapes the individual's philosophies and attitudes may work to his advantage in modifying them in a more rational direction as he is influenced by the climate of formal education. Such a speculation is comforting to those who would prefer to think of institutions of higher learning as shaping the whole person beneficially rather than simply acting as "fact factories".

No partial correlations were done in this study, and the question is also raised whether or not intelligence would actually show a positive correlation with irrational beliefs if education level were not confounding the results. An indirect answer to this question is furnished by the fact that in a specific education level group, the college seniors of Group B, most of the IBT scales did indeed show a positive correlation with intelligence. Future studies should involve partial correlation techniques to determine the actual relationship of each of the variables to the various IBT scales.

Implications of the Data for Ellis' Position

To the extent this study was structured to do so, the results show strong confirmation of Ellis' theoretical system and position. His exposition of irrational ideas was shown to be accurate in that they are functionally distinct constructs measurable in heterogeneous populations. Although causal relationships could not be and were not confirmed by the data available from this study, the existence of highly significant functional relationships as hypothesized between most irrational beliefs as measured by the IBT and every index of disturbance in the study leaves strong implications of validity for

Ellis' approach. Although as discussed two of the ten beliefs set out by Ellis did not correlate with these indices, the lack of a relationship between them and neurotic behavior is not disproved due to lack of range in the criteria.

## CHAPTER V

### SUMMARY

In the development of rational-emotive therapy, Albert Ellis has postulated among other things a system of beliefs or philosophies common in our culture which are inherently irrational and conducive to maladjustment and emotional disturbance. In this study an instrument was constructed to measure these beliefs using factor structure as criteria. The instrument was then also validated against indices of personality and maladjustment.

Initial item selection was by consensual validation of content with judges. Following administration of these items to an initial student sample, scores were factor analyzed and factors found defined by the irrational beliefs. Further item selection was on the basis of factor loadings and intercorrelation analysis. The final instrument, called the Irrational Beliefs Test or IBT, consisted of 100 items measuring ten irrational beliefs in separate scales, all of them validated against orthogonal factors. Cross validation of construct validity was then made with a heterogeneous sample of 427 subjects. The factor structure upon which the test was based was replicated satisfactorily and construct validities were found in the cross validation sample ranging from .561 to .824 with a mean of .699. Homogeneity reliability coefficients for the 10 item scales were found to range from .662 to .801 with a mean of .737, based on intercorrelations of item scores and scale scores. Stability based on 24 hour test-retest correlations of scores was .921 for full scale, ranging from .675 to .872 for individual scales. Descriptive statistics for score distributions were calculated and found satisfactory.

As criteria for concurrent validation of the instrument and investigation of Ellis' theoretical position with respect to irrational beliefs, all subjects in the cross validation sample were also administered a 16PF and a 25 item measure of admitted common psychiatric complaints or symptoms. The relationship of age, sex, and education level

to irrational beliefs as measured by the IBT was also investigated.

All IBT scales but two correlated highly with admitted symptomology. IBT total score correlated .611 with the summated symptom score, and a multiple R of .717 was found between symptom admission and IBT scales. The same eight IBT scales correlated highly with the six 16PF factors common to all clinical groups and comprising the second-order questionnaire factor of anxiety. Individual IBT scales varied in their relationship to specific clinical personality factors; but IBT total score correlations averaged .417 and multiple R's from .432 to .630 were seen with a mean of .526. Less impressive but significant relationships of IBT scales with nonclinical personality scales of the 16PF were also determined.

Differences in IBT scores between a normal adult sample and a mental hospital sample were investigated and found to be highly significant for 8 of the 11 scores, most of them beyond the .0005 level.

Age was not found to be significantly related to irrational beliefs as measured by the IBT, but highly significant sex differences were found specific to scales. Although intelligence was a significant inverse correlate of IBT scores on only several scales, education level had a much greater negative functional relationship that involved most scales.

It was concluded that on the basis of the data the IBT was sufficiently reliable and valid as a measure of irrational beliefs for use in both research and specific clinical needs, although suggestions for refinement were made. Ellis' theoretical position with respect to the irrational beliefs was substantially confirmed by the results of the study, although due to its nature no causal relationships could be established. Implications and interpretations of specific findings were discussed.

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## APPENDIX A

VARIMAX MATRIX  
 FROM FINAL 100 ITEM FACTOR ANALYSIS  
 GROUP A, N=131

Key

Scale	Factor	Items used in Validation									
1	1	1	15	21	31	57	64	73	81	88	92
2	6	8	28	32	38	48	51	65	82	83	98
3	9	2	9	22	29	39	45	58	70	77	*
4	12	12	16	23	40	52	59	78	85	93	*
5	4	13	17	41	53	60	71	74	89	94	99
6	5	3	18	24	33	46	61	66	79	84	90
7	8	4	*	34	42	47	49	62	67	75	80
8	3	5	11	25	30	35	43	55	91	95	100
9	7	6	26	36	44	50	63	68	72	86	96
10	10	7	14	19	20	27	37	56	76	87	97

\*indicates item replaced by another and not used in  
 calculating validity





## APPENDIX B

VARIMAX MATRIX  
100 ITEM FACTOR ANALYSIS  
GROUP B, N=427

Key

Scale	Factor
1	8
2	7
3	6
4	12
5	4
6	1
7	2
8	5
9	3
10	14

Note: This factor analysis was performed on raw item scores before reversal for scoring. Therefore signs must be ignored. After reversal, all items on a scale load that scale factor with the same sign.

[illegible]



51	0	172	-0	110	-0	095	0	015	-0	069	0	025	0	159	-0	220	0	280	-0	001	-0	065	-0	055	0	130	-0	012	-0	162
52	-0	013	0	156	-0	127	0	018	-0	021	0	025	-0	049	0	164	-0	002	-0	059	0	062	-0	155	0	033	-0	009	-0	060
53	-0	008	0	025	-0	110	0	016	-0	055	0	039	0	040	0	008	0	005	0	062	0	015	-0	032	-	147	0	072	-0	120
54	-0	112	-0	034	-0	073	-0	093	-0	063	0	016	-0	024	0	125	-0	012	-0	040	-0	079	-0	371	0	013	0	062	-0	270
55	-0	122	-0	053	-0	247	-0	078	-0	009	0	182	-0	053	0	070	-0	027	-0	009	0	004	0	043	-0	016	0	066	-0	395
56	-0	479	0	084	-0	106	-0	013	0	009	-0	005	-0	008	0	181	0	017	-0	092	-0	040	-0	098	0	301	-0	062	0	004
57	-0	096	0	026	-0	122	0	022	0	031	0	019	0	076	0	011	0	157	0	076	-0	009	-0	066	0	111	-0	007	-0	061
58	-0	081	0	163	0	055	0	025	0	032	-0	009	0	169	0	145	0	038	-0	005	0	142	-0	035	0	104	-0	087	-0	139
59	-0	326	0	149	-0	015	0	075	0	007	0	044	-0	089	0	130	0	063	0	136	-0	042	-0	138	0	052	-0	044	-0	050
60	0	145	0	150	-0	168	0	105	0	163	-0	049	-0	059	0	025	-0	158	-0	098	0	093	0	055	0	091	-0	144	-0	257
61	-0	162	0	158	-0	085	0	009	0	025	0	089	0	131	0	454	0	019	-0	117	-0	161	0	156	0	014	-0	021	-0	106
62	0	115	-0	022	-0	151	-0	084	-0	099	0	049	-0	457	0	049	0	004	0	235	0	043	0	092	0	051	0	016	-0	203
63	-0	003	-0	064	-0	113	0	384	-0	187	-0	230	-0	198	0	090	-0	008	0	098	0	055	-0	115	0	089	0	034	-0	086
64	-0	292	0	033	-0	054	0	073	-0	012	0	056	0	031	0	164	-0	105	-0	015	-0	032	-0	218	0	263	-0	108	-0	197
65	-0	038	0	004	0	035	0	508	0	121	-0	060	-0	059	0	032	-0	137	-0	012	0	023	0	004	-0	021	-0	053	-0	147
66	0	587	-0	082	-0	075	0	059	-0	059	0	117	0	122	0	002	0	028	0	196	-0	050	0	098	-0	144	-0	108	-0	190
67	0	147	-0	193	-0	003	0	063	-0	058	0	031	0	233	0	050	0	052	-0	015	0	053	0	104	0	053	-0	052	-0	369
68	0	010	0	099	0	106	0	152	-0	010	-0	035	-0	025	0	166	-0	061	0	045	0	510	0	021	0	102	0	002	-0	019
69	0	246	0	000	-0	379	-0	005	-0	134	0	139	0	052	0	027	-0	001	-0	009	-0	219	0	029	0	013	-0	020	-0	023
70	-0	033	-0	035	-0	013	0	065	0	093	-0	080	0	162	0	055	-0	032	-0	059	0	081	0	041	0	138	0	076	-0	237
71	0	495	-0	120	-0	062	0	029	-0	094	0	046	0	155	0	280	0	061	0	265	-0	050	-0	042	0	030	-0	660	0	019
72	0	282	0	052	0	010	0	046	-0	135	-0	049	0	287	0	177	-0	101	0	241	0	265	-0	046	0	102	0	002	-0	213
73	0	101	-0	057	-0	210	0	137	-0	189	0	198	0	135	0	065	0	149	0	005	-0	146	0	245	-0	034	-0	012	-0	135
74	-0	360	-0	021	-0	018	0	168	-0	150	0	081	-0	242	0	091	-0	140	-0	035	0	002	-0	324	0	137	0	002	0	052
75	0	231	0	186	-0	082	0	130	-0	209	0	212	0	046	0	111	-0	129	0	251	-0	008	-0	081	0	023	0	034	-0	021
76	0	038	-0	008	0	016	0	260	-0	094	0	007	0	054	0	094	0	044	0	123	-0	116	-0	035	0	018	0	072	-0	059
77	0	155	0	064	0	047	0	019	-0	420	-0	109	0	178	0	064	0	101	0	046	0	084	-0	010	0	041	0	047	-0	067
78	-0	178	-0	073	-0	579	-0	110	0	004	-0	106	0	109	0	134	0	039	0	209	0	081	0	023	0	018	0	033	-0	078
79	0	024	0	129	0	090	0	247	-0	004	-0	104	0	055	0	166	-0	262	-0	047	0	103	-0	043	-0	004	-0	321	0	060
80	-0	392	-0	091	-0	014	-0	002	-0	185	-0	144	0	073	0	354	0	064	0	324	0	113	-0	039	0	132	-0	029	-0	251
81	0	460	-0	071	-0	062	0	039	-0	102	0	115	0	202	0	053	-0	045	0	086	-0	012	0	226	0	207	0	037	-0	046
82	-0	097	0	043	0	188	0	062	-0	380	-0	094	-0	135	0	066	-0	181	0	153	0	218	-0	113	-0	010	-0	082	-0	096
83	-0	123	-0	006	-0	188	-0	091	-0	043	-0	058	0	324	0	090	0	076	-0	100	-0	300	-0	019	-0	110	-0	001	-0	219
84	0	063	0	306	0	192	0	359	-0	043	0	004	-0	124	0	262	0	032	0	064	-0	054	-0	103	0	013	-0	061	-0	147
85	-0	374	0	044	0	009	0	049	-0	106	0	036	0	041	0	034	0	183	-0	014	-0	036	-0	147	-0	117	-0	187	-0	201
86	-0	221	0	070	0	009	0	337	-0	164	-0	011	-0	090	0	023	-0	077	0	214	0	190	0	037	0	071	-0	089	0	049
87	-0	038	0	120	0	131	0	086	0	066	0	076	-0	043	0	131	-0	163	0	155	0	337	-0	004	0	059	-0	186	-0	193
88	-0	025	0	003	-0	323	0	061	0	016	0	067	0	153	0	069	-0	018	0	122	-0	016	-0	038	-0	144	-0	187	-0	188
89	0	167	0	164	0	078	0	087	-0	345	0	058	0	175	0	059	-0	070	0	321	0	174	-0	081	-0	017	0	044	-0	080
90	-0	151	0	109	-0	011	0	162	-0	039	-0	057	-0	407	0	225	-0	208	0	078	0	111	-0	133	0	120	-0	034	-0	014
91	-0	053	0	003	-0	046	0	087	-0	016	0	006	-0	296	0	405	-0	069	0	083	0	157	-0	031	0	077	0	035	-0	017
92	-0	047	0	207	0	046	0	187	-0	059	-0	006	-0	296	0	016	-0	001	0	067	-0	051	-0	116	-0	015	-0	069	-0	161
93	-0	248	0	007	-0	025	0	111	0	034	-0	037	-0	255	0	077	-0	061	0	021	0	015	-0	162	-0	011	-0	114	-0	309
94	-0	068	0	062	-0	042	-0	040	-0	002	0	015	-0	271	0	081	-0	061	0	021	0	031	0	162	-0	061	-0	144	0	095
95	-0	068	0	020	0	060	0	462	-0	179	0	037	-0	271	0	067	-0	292	0	039	-0	085	0	021	0	034	0	037	0	011
96	0	241	-0	113	-0	133	0	087	-0	003	0	123	0	000	0	067	-0	039	0	143	0	339	-0	021	0	064	-0	086	0	095
97	0	020	0	278	0	050	0	205	0	293	0	067	-0	105	0	077	-0	221	0	143	0	022	-0	164	-0	058	-0	026	0	095
98	0	081	0	063	-0	050	0	058	0	085	0	229	0	100	0	129	-0	247	0	160	-0	022	-0	230	-0	053	-0	163	-0	297
99	-0	387	0	093	0	031	0	204	-0	016	-0	023	0	036	0	069	-0	070	0	037	-0	087	-0	053	-0	068	-0	058	0	031
100	0	048	-0	093	0	011	0	229	-0	086	-0	000	-0	055	-0	002	-0	057	0	029	-0	100	0	036	0	003	-0	545	-0	047

## APPENDIX C

INTERCORRELATION MATRIX OF MAJOR  
VARIABLES, GROUP B

N=427

Key

No.	Descr.
1 thru 25	symptom items by number
26	16PF B
27	sex
28	education
29	age
30 thru 39	IBT 1 thru IBT 10
40	symptom total
41	16PF A
42 thru 55	16PF C thru 16PF Q4
56	IBT total

	1	2	3	4	5	6	7	8	9
2	0.424								
3	0.386	0.395							
4	0.526	0.575	0.474						
5	0.224	0.201	0.142	0.218					
6	0.300	0.365	0.415	0.394	0.189				
7	0.312	0.337	0.379	0.426	0.144	0.444			
8	0.468	0.373	0.373	0.471	0.281	0.344	0.392		
9	0.333	0.408	0.400	0.486	0.243	0.460	0.512	0.472	
10	0.492	0.424	0.328	0.478	0.230	0.398	0.396	0.465	0.431
11	0.324	0.350	0.330	0.386	0.243	0.380	0.322	0.315	0.384
12	0.403	0.437	0.357	0.508	0.282	0.420	0.495	0.518	0.496
13	0.466	0.361	0.391	0.500	0.300	0.385	0.397	0.488	0.383
14	0.312	0.360	0.330	0.472	0.261	0.284	0.296	0.429	0.423
15	0.446	0.419	0.301	0.488	0.175	0.346	0.381	0.420	0.449
16	0.385	0.296	0.499	0.422	0.072	0.466	0.335	0.353	0.388
17	0.333	0.379	0.342	0.458	0.159	0.441	0.377	0.478	0.497
18	0.297	0.472	0.289	0.435	0.160	0.342	0.283	0.410	0.488
19	0.284	0.263	0.276	0.345	0.164	0.286	0.321	0.351	0.389
20	0.216	0.344	0.353	0.409	0.152	0.345	0.332	0.351	0.481
21	0.336	0.519	0.407	0.547	0.196	0.395	0.380	0.416	0.484
22	0.263	0.341	0.392	0.445	0.328	0.414	0.385	0.430	0.449
23	0.406	0.359	0.378	0.441	0.488	0.377	0.322	0.402	0.360
24	0.238	0.334	0.383	0.424	0.173	0.310	0.201	0.271	0.285
25	0.298	0.329	0.359	0.419	0.269	0.417	0.368	0.379	0.478
26	0.154	0.077	0.097	0.095	-0.001	0.137	-0.010	0.056	0.079
27	-0.080	-0.156	-0.076	-0.148	-0.218	-0.128	-0.074	-0.138	-0.135
28	-0.013	-0.001	0.007	-0.053	-0.079	0.133	0.059	0.064	0.196
29	-0.051	-0.038	-0.048	-0.124	-0.144	-0.080	-0.137	-0.122	-0.156
30	0.348	0.300	0.304	0.313	0.095	0.306	0.246	0.262	0.283
31	0.315	0.271	0.298	0.338	0.304	0.289	0.267	0.328	0.295
32	0.096	0.125	0.132	0.132	0.237	0.182	0.064	0.138	0.119
33	0.350	0.281	0.201	0.276	0.301	0.287	0.205	0.200	0.219
34	0.139	0.254	0.157	0.192	0.084	0.174	0.134	0.114	0.156
35	0.521	0.396	0.337	0.432	0.256	0.393	0.353	0.461	0.357
36	0.227	0.305	0.269	0.275	0.142	0.288	0.255	0.174	0.231
37	0.048	-0.053	0.080	-0.014	-0.012	0.075	-0.014	0.022	-0.104
38	0.292	0.338	0.273	0.332	0.193	0.354	0.312	0.354	0.351
39	-0.038	-0.054	-0.015	-0.047	-0.044	-0.031	-0.103	-0.081	-0.062
40	0.594	0.622	0.602	0.731	0.394	0.626	0.593	0.673	0.698
41	-0.119	-0.090	-0.202	-0.126	-0.079	-0.138	-0.140	-0.097	-0.151
42	-0.247	-0.310	-0.234	-0.296	-0.270	-0.345	-0.288	-0.337	-0.358
43	-0.007	0.001	-0.062	-0.000	0.284	-0.046	0.025	0.029	0.001
44	-0.104	-0.116	-0.204	-0.155	0.020	-0.252	-0.137	-0.142	-0.219
45	-0.081	-0.167	-0.206	-0.214	-0.138	-0.166	-0.147	-0.133	-0.170
46	-0.272	-0.224	-0.325	-0.285	-0.067	-0.325	-0.251	-0.180	-0.245
47	0.083	-0.019	0.024	0.018	-0.114	0.044	-0.010	0.017	-0.019
48	0.245	0.178	0.180	0.216	0.230	0.245	0.242	0.221	0.231
49	0.067	0.105	0.139	0.090	0.063	0.118	0.168	0.089	0.177
50	-0.051	-0.134	-0.175	-0.158	-0.089	-0.076	-0.194	-0.062	-0.091
51	0.374	0.372	0.342	0.405	0.237	0.419	0.383	0.421	0.403
52	-0.084	-0.022	-0.013	-0.043	0.028	-0.017	-0.000	-0.064	-0.065
53	-0.029	0.007	0.060	0.052	0.028	0.022	0.023	-0.033	0.032
54	-0.250	-0.251	-0.215	-0.236	-0.316	-0.183	-0.207	-0.226	-0.298
55	0.396	0.312	0.341	0.379	0.404	0.356	0.361	0.344	0.385
56	0.454	0.427	0.394	0.440	0.298	0.451	0.342	0.391	0.368

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
11	0.420	0.433	0.574	0.326	0.387	0.338	0.371	0.449	0.451	0.290	0.490	0.544	0.502	0.384	0.481
12	0.538	0.419	0.466	0.493	0.316	0.425	0.266	0.356	0.640	0.389	0.319	0.479	0.404	0.375	0.069
13	0.483	0.370	0.585	0.341	0.318	0.423	0.317	0.482	0.485	0.333	0.338	0.590	0.523	0.115	0.202
14	0.310	0.423	0.344	0.465	0.403	0.352	0.345	0.435	0.297	0.286	0.375	0.479	0.661	0.163	0.202
15	0.688	0.378	0.344	0.292	0.314	0.427	0.346	0.439	0.407	0.392	0.338	0.479	0.248	0.010	0.202
16	0.379	0.382	0.493	0.306	0.352	0.423	0.346	0.435	0.513	0.392	0.338	0.590	0.090	0.073	0.172
17	0.453	0.279	0.434	0.306	0.314	0.427	0.346	0.439	0.407	0.392	0.338	0.479	0.120	0.255	0.293
18	0.459	0.310	0.381	0.306	0.352	0.423	0.346	0.439	0.407	0.392	0.338	0.479	0.153	0.317	0.270
19	0.308	0.414	0.486	0.412	0.458	0.327	0.346	0.439	0.407	0.392	0.338	0.479	0.299	0.172	0.293
20	0.422	0.301	0.479	0.412	0.458	0.327	0.346	0.439	0.407	0.392	0.338	0.479	0.232	0.352	0.270
21	0.387	0.328	0.444	0.317	0.390	0.334	0.365	0.447	0.407	0.392	0.338	0.479	0.266	0.152	0.165
22	0.485	0.347	0.444	0.357	0.390	0.334	0.365	0.447	0.407	0.392	0.338	0.479	0.232	0.352	0.270
23	0.308	0.429	0.444	0.357	0.390	0.334	0.365	0.447	0.407	0.392	0.338	0.479	0.266	0.152	0.165
24	0.095	0.097	0.160	0.174	0.107	0.195	0.117	0.234	0.202	0.182	0.190	0.270	0.232	0.352	0.270
25	0.157	0.089	0.104	0.039	0.027	0.135	0.064	0.151	0.191	0.182	0.190	0.270	0.232	0.352	0.270
26	0.147	0.028	0.126	0.265	0.221	0.309	0.282	0.245	0.122	0.182	0.190	0.270	0.232	0.352	0.270
27	0.303	0.208	0.306	0.314	0.351	0.235	0.079	0.163	0.122	0.182	0.190	0.270	0.232	0.352	0.270
28	0.364	0.079	0.098	0.195	0.151	0.246	0.181	0.171	0.122	0.182	0.190	0.270	0.232	0.352	0.270
29	0.091	0.191	0.281	0.360	0.246	0.139	0.118	0.415	0.317	0.182	0.190	0.270	0.232	0.352	0.270
30	0.302	0.154	0.092	0.079	0.138	0.225	0.364	0.226	0.239	0.182	0.190	0.270	0.232	0.352	0.270
31	0.133	0.325	0.430	0.458	0.225	0.138	0.118	0.415	0.317	0.182	0.190	0.270	0.232	0.352	0.270
32	0.406	0.431	0.210	0.221	0.051	0.397	0.289	0.056	0.239	0.182	0.190	0.270	0.232	0.352	0.270
33	0.230	0.044	0.222	0.021	0.302	0.000	0.16	0.056	0.407	0.303	0.266	0.423	0.068	0.418	0.308
34	0.025	0.273	0.347	0.326	0.064	0.344	0.307	0.381	0.401	0.303	0.266	0.423	0.068	0.418	0.308
35	0.324	0.026	0.088	0.099	0.067	0.047	0.301	0.066	0.111	0.078	0.042	0.10	0.683	0.073	0.093
36	0.020	0.606	0.744	0.675	0.060	0.690	0.582	0.673	0.645	0.574	0.589	0.732	0.683	0.605	0.568
37	0.076	0.089	0.135	0.117	0.110	0.066	0.163	0.051	0.180	0.074	0.266	0.199	0.124	0.105	0.131
38	0.284	0.087	0.341	0.359	0.226	0.110	0.264	0.332	0.269	0.289	0.343	0.342	0.326	0.319	0.270
39	0.013	0.287	0.008	0.046	0.111	0.055	0.123	0.093	0.310	0.266	0.343	0.342	0.326	0.319	0.270
40	0.191	0.053	0.143	0.099	0.180	0.115	0.201	0.104	0.162	0.101	0.106	0.209	0.234	0.152	0.163
41	0.124	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
42	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038
43	0.191	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
44	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038
45	0.124	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
46	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038
47	0.191	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
48	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038
49	0.124	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
50	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038
51	0.191	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
52	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038
53	0.124	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
54	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038
55	0.191	0.233	0.215	0.203	0.180	0.115	0.400	0.200	0.249	0.165	0.313	0.267	0.284	0.225	0.342
56	0.052	0.222	0.084	0.082	0.203	0.055	0.065	0.033	0.053	0.013	0.103	0.027	0.020	0.009	0.038

	25	26	27	28	29	30	31	32	33	34	35	36	37	38
26	0.014													
27	0.157	0.103												
28	0.063	0.102	0.020											
29	0.159	0.092	0.296	0.048										
30	0.232	0.143	0.080	0.026	0.048									
31	0.324	0.067	0.105	0.042	0.102	0.443								
32	0.231	0.160	0.228	0.017	0.192	0.149	0.266							
33	0.172	0.140	0.029	0.018	0.060	0.295	0.361	0.174						
34	0.200	0.100	0.075	0.099	0.053	0.151	0.197	0.188	0.087					
35	0.366	0.075	0.202	0.102	0.099	0.473	0.456	0.231	0.446	0.169	0.249	0.037	0.015	0.113
36	0.277	0.046	0.073	0.060	0.016	0.216	0.300	0.098	0.120	0.267	0.121	0.353	0.084	0.510
37	0.050	0.158	0.030	0.027	0.013	0.200	0.335	0.012	0.049	0.009	0.383	0.085	0.033	0.171
38	0.396	0.119	0.207	0.021	0.183	0.234	0.298	0.256	0.138	0.380	0.010	0.373	0.120	0.285
39	0.003	0.176	0.183	0.036	0.096	0.058	0.021	0.197	0.064	0.209	0.586	0.097	0.053	0.124
40	0.665	0.077	0.240	0.080	0.158	0.383	0.470	0.237	0.370	0.247	0.156	0.048	0.153	0.132
41	0.158	0.193	0.080	0.047	0.065	0.049	0.160	0.137	0.052	0.014	0.421	0.060	0.042	0.149
42	0.314	0.168	0.068	0.041	0.099	0.275	0.317	0.194	0.295	0.186	0.421	0.329	0.148	0.273
43	0.004	0.221	0.063	0.203	0.015	0.111	0.118	0.093	0.106	0.031	0.059	0.048	0.029	0.132
44	0.191	0.062	0.015	0.336	0.047	0.097	0.175	0.138	0.070	0.080	0.131	0.060	0.148	0.149
45	0.228	0.035	0.133	0.215	0.063	0.038	0.096	0.033	0.048	0.098	0.065	0.333	0.029	0.273
46	0.298	0.065	0.130	0.098	0.103	0.284	0.361	0.219	0.180	0.152	0.326	0.389	0.181	0.295
47	0.018	0.460	0.124	0.031	0.128	0.079	0.012	0.188	0.101	0.008	0.047	0.089	0.097	0.304
48	0.245	0.218	0.228	0.114	0.110	0.137	0.303	0.279	0.257	0.046	0.341	0.235	0.092	0.078
49	0.082	0.156	0.001	0.063	0.054	0.022	0.070	0.101	0.157	0.084	0.036	0.055	0.126	0.137
50	0.147	0.060	0.021	0.192	0.054	0.155	0.070	0.005	0.157	0.046	0.164	0.268	0.126	0.387
51	0.410	0.120	0.215	0.001	0.147	0.350	0.356	0.215	0.350	0.178	0.515	0.349	0.054	0.137
52	0.028	0.142	0.065	0.111	0.086	0.151	0.048	0.142	0.032	0.141	0.174	0.042	0.165	0.028
53	0.071	0.075	0.052	0.093	0.013	0.169	0.007	0.047	0.005	0.036	0.054	0.005	0.185	0.032
54	0.220	0.013	0.066	0.198	0.039	0.128	0.228	0.108	0.296	0.028	0.335	0.268	0.185	0.174
55	0.326	0.163	0.151	0.017	0.080	0.315	0.383	0.189	0.467	0.082	0.537	0.299	0.059	0.273
56	0.422	0.028	0.234	0.004	0.144	0.634	0.641	0.482	0.493	0.507	0.702	0.529	0.257	0.618

39 40

40-0.037  
 41-0.020-0.199  
 42-0.098-0.471  
 43-0.007-0.025  
 44-0.060-0.263  
 45-0.116-0.267  
 46-0.006-0.398  
 47-0.092-0.012  
 48-0.012-0.362  
 49-0.166-0.184  
 50-0.035-0.163  
 51-0.065-0.600  
 52-0.062-0.062  
 53-0.076-0.083  
 54-0.047-0.353  
 55-0.091-0.547  
 56-0.318-0.611

	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
42	0.064	0.072	0.348	0.140	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
43	0.001-0.183	0.247-0.346	0.243-0.343	0.547-0.045	0.083-0.229	0.157-0.065	0.230-0.024	0.089-0.422	0.223-0.132	0.030-0.066	0.036-0.373	0.026-0.113	0.023-0.111	0.293	0.491
44	0.029	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
45	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
46	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
47	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
48	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
49	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
50	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
51	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
52	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
53	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
54	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
55	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491
56	0.032	0.346	0.343	0.547	0.072	0.101	0.131	0.159	0.037	0.291	0.123	0.075	0.009	0.454	0.491

APPENDIX D

SYMPTOM MEASURE  
USED IN THE STUDY

Everyone has his good days and bad days, and all of us have a certain amount of unpleasantness in our lives. This brief index measures the extent to which you react to your problems in certain ways.

You may feel free to be as honest with yourself as possible in your answers, since the results will not be looked at for any individual. The purpose of this index is to investigate any relationship of these feelings and reactions statistically to various scores on the other tests you are taking. The scoring and computations are all done on a computer. Your cooperation will contribute greatly to the research being done.

For this index, you will use the same answer sheet provided for the IBT, except you will use the bottom part this time according to the numbers of the items. For each statement there are five possible answers:

- 1 = almost never
- 2 = occasionally
- 3 = some of the time
- 4 = much of the time
- 5 = most of the time

Your answer for each item should be the one that most accurately describes you. For example, on the first item, if you almost never worry, you would mark #1; but if you have a great tendency to worry about various things, answer #4 or #5 would be more accurate.

- 145. I worry.
- 146. I feel unhappy.
- 147. I feel inadequate and inefficient.
- 148. I become depressed and blue.
- 149. I get angry easily.
  
- 150. I would like to be different from the way I am.
- 151. I have guilty feelings.
- 152. I live with a lot of anxiety.
- 153. I don't like myself very much.
- 154. I tend to be tense and nervous.
  
- 155. I have trouble doing things I know I need to do.
- 156. My emotions give me trouble.
- 157. Frustrations "bug" me.
- 158. I tend to be pessimistic.
- 159. My nerves bother me.
  
- 160. I don't have enough confidence.
- 161. My problems seem to keep repeating themselves.
- 162. Life is not enjoyable or fun.
- 163. I often feel bad physically.
- 164. I don't feel close to other people.
  
- 165. Life seems dreary and difficult.
- 166. I feel a lot of resentment.
- 167. I become upset easily.
- 168. I find it hard to get interested in things.
- 169. I feel like giving up.



APPENDIX E

RESEARCH FORM OF THE IBT  
USED IN THE STUDY

# I B T

## INSTRUCTIONS

This is an inventory of the way you believe and feel about various things. There are a number of statements with which you will tend to agree or disagree. You will be given an answer sheet with spaces to mark one of five possible answers to each item. For each statement, you should mark your answer sheet as follows, according to your own reaction to the item:

mark #1 if you STRONGLY DISAGREE  
mark #2 if you MODERATELY DISAGREE  
mark #3 if you NEITHER AGREE NOR DISAGREE  
mark #4 if you MODERATELY AGREE  
mark #5 if you STRONGLY AGREE

It is not necessary to think over any item very long. Mark your answer quickly and go on to the next statement.

Be sure to mark how you actually feel about the statement, not how you think you should feel.

Try to avoid the neutral or "3" response as much as possible. Select this answer only if you really cannot decide whether you tend to agree or disagree with a statement.

Before you start, be sure to print your name, sex, and age at the top of the answer sheet where indicated. In the space for "grade", place the number of the highest school grade completed. If you have had college, one year would be 13, four years would be 16, etc.

Your answer sheet is a standard form which is scored by a computer, so you may feel free to be as honest in your answers as possible. To avoid misreading by the computer, be sure your marks are heavy and within the dotted lines.

1. It is important to me that others approve of me.
2. I hate to fail at anything.
3. People who do wrong deserve what they get.
4. I usually accept what happens philosophically.
5. If a person wants to, he can be happy under almost any circumstances.
6. I have a fear of some things that often bothers me.
7. I usually put off important decisions.
8. Everyone needs someone he can depend on for help and advice.
9. "A zebra cannot change his stripes".
10. There is a right way to do everything.
11. I like the respect of others, but I don't have to have it.
12. I avoid things I cannot do well.
13. Too many evil persons escape the punishment they deserve.
14. Frustrations don't upset me.
15. People are disturbed not by situations but by the view they take of them.
16. I feel little anxiety over unexpected dangers or future events.
17. I try to go ahead and get irksome tasks behind me when they come up.
18. I try to consult an authority on important decisions.
19. It is almost impossible to overcome the influences of the past.
20. There is no perfect solution to anything.
21. I want everyone to like me.
22. I don't mind competing in activities where others are better than I.
23. Those who do wrong deserve to be blamed.
24. Things should be different from the way they are.
25. I cause my own moods.
26. I often can't get my mind off some concern.
27. I avoid facing my problems.
28. People need a source of strength outside themselves.
29. Just because something once strongly affects your life doesn't mean it need do so in the future.
30. There is seldom an easy way out of life's difficulties.
31. I can like myself even when many others don't.
32. I like to succeed at something but I don't feel I have to.
33. Immorality should be strongly punished.
34. I often get disturbed over situations I don't like.

35. People who are miserable have usually made themselves that way.
36. If I can't keep something from happening, I don't worry about it.
37. I usually make decisions as promptly as I can.
38. There are certain people that I depend on greatly.
39. People overvalue the influence of the past.
40. Some problems will always be with us.
41. If others dislike me, that's their problem, not mine.
42. It is highly important to me to be successful in everything I do.
43. I seldom blame people for their wrongdoings.
44. I usually accept things the way they are, even if I don't like them.
45. A person won't stay angry or blue long unless he keeps himself that way.
46. I can't stand to take chances.
47. Life is too short to spend it doing unpleasant tasks.
48. I like to stand on my own two feet.
49. If I had had different experiences I could be more like I want to be.
50. Every problem has a correct solution.
51. I find it hard to go against what others think.
52. I enjoy activities for their own sake, no matter how good I am at them.
53. The fear of punishment helps people be good.
54. If things annoy me, I just ignore them.
55. The more problems a person has, the less happy he will be.
56. I am seldom anxious over the future.
57. I seldom put things off.
58. I am the only one who can really understand and face my problems.
59. I seldom think of past experiences as affecting me now.
60. We live in a world of chance and probability.
61. Although I like approval, it's not a real need for me.
62. It bothers me when others are better than I am at something.
63. Everyone is basically good.
64. I do what I can to get what I want and then don't worry about it.
65. Nothing is upsetting in itself-- only in the way you interpret it.
66. I worry a lot about certain things in the future.
67. It is difficult for me to do unpleasant chores.

68. I dislike for others to make my decisions for me.
69. We are slaves to our personal histories.
70. There is seldom an ideal solution to anything.
71. I often worry about how much people approve of and accept me.
72. It upsets me to make mistakes.
73. It's unfair that "the rain falls on both the just and the unjust".
74. I am fairly easygoing about life.
75. More people should face up to the unpleasantness of life.
76. Sometimes I can't get a fear off my mind.
77. A life of ease is seldom very rewarding.
78. I find it easy to seek advice.
79. Once something strongly affects your life, it always will.
80. It is better to look for a practical solution than a perfect one.
81. I have considerable concern with what people are feeling about me.
82. I often become quite annoyed over little things.
83. I usually give someone who has wronged me a second chance.
84. I dislike responsibility.
85. There is never any reason to remain sorrowful for very long.
86. I hardly ever think of such things as death or atomic war.
87. People are happiest when they have challenges and problems to overcome.
88. I dislike having to depend on others.
89. People never change basically.
90. I feel I must handle things in the right way.
91. It is annoying but not upsetting to be criticized.
92. I'm not afraid to do things which I cannot do well.
93. No one is evil, even though his deeds may be.
94. I seldom become upset over the mistakes of others.
95. Man makes his own hell within himself.
96. I often find myself planning what I would do in different dangerous situations.
97. If something is necessary, I do it even if it is unpleasant.
98. I've learned not to expect someone else to be very concerned about my welfare.
99. I don't look upon the past with any regrets.
100. There is no such thing as an ideal set of circumstances.